

AN HISTORICAL
INTRODUCTION
TO MODERN
PHILOSOPHY

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TO MODERN PHILOSOPHY

PREFACE

THIS BOOK IS INTENDED TO LEAD THE READER TO AN understanding of contemporary philosophy, allowing him to play his full part in the intellectual life of this time.

Recent advances in science and logic have effected a radical reorientation of thought, necessitating profound readjustments in our conceptions of the individual, society, and nature. So deep do these changes go that they seem to cut through the living tissue which binds the present to the past. We face unprecedented tasks, to the solution of which the past brings little or no help; yet the tasks are so urgent that only immediate action, unhindered by time-consuming thought, seems to be of avail. To this pressure of urgent and unprecedented tasks comes the modern habit of mind, which assumes that problems arising out of present conditions must and can be solved by a better perception of present activities. How should history help meet the emergency which history has precipitated?

The publication of an historical introduction to philosophy therefore calls for some defense. The full defense of this historical approach must be left to the chapters which follow. These chapters indicate the nature of the problem which has stimulated the development of the western intellect, a problem which has become steadily more insistent, until today its solution is in literal fact a matter of life and death. The problem

the strength of those very advances in science and logic which initially threw us into intellectual confusion, it is possible to discern the moral foundation on which must be erected the Commonwealth of man.

It is the task of philosophy to discern and to promulgate this moral truth, making itself the center and container of all educational. For of what profit is science, or art, or any industrial or professional technique, if there be none alive to put it to use? The bibliographies appended to all but the later chapters are meant to be suggestive rather than exhaustive, directing the student to reading-matter which should be available in college and public libraries. The concurrent reading of one or more short histories of philosophy will amplify what is presented in this book, and provide a basis for its critical estimate. Especially recommended are the selections from the philosophic classics. It is by coming to grips with these men who have shaped the human intellect that the student will develop his own intellectual power. These classics, viewed critically, with understanding of the times which produced them. For it is still and always true that

“Who reads
Incessantly, and to his reading brings
A spirit and judgment equal or superior,
Unsettled and uncertain still remains
Deep versed in books but shallow.”

May the ready spirit of Milton, who translated himself into action, be with this age, and who read this book.

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AN HISTORICAL INTRODUCTION
TO MODERN PHILOSOPHY

1 THE PLACE OF PHILOSOPHY IN CONTEMPORARY LIFE

THE RECENT WAR AND ITS AFTERMATH MAKE CLEAR to us the radical transition which has just occurred. Western Europe, the source of western civilization, is no longer its center. Western civilization has now two centers, one located in North America and the other in Russia. These two peoples head the van of human progress because they most explicitly base their social constitutions upon political theory. A political theory expounds some concept of justice. It therefore involves initially an ethical or social philosophy, and finally a complete philosophy of nature and man.

It is apparent to most of us that we are entering a new political epoch, an era in which government becomes to an unprecedented degree the agency by which man seeks to control his destiny, and especially to regulate conduct which directly affects other human individuals. Government tends today to replace the religious, educational, charitable, and other institutions which earlier helped to ameliorate human relations. It is evident that this empowerment of government will proceed further, and that the United States and Soviet Russia loom so large in world affairs not only because of their size, but because

achieved by establishing the right economic system. The controversy seems to turn on the question whether political history determines economic history, or vice versa; and it is not perceived that the real issue is whether or not the individual shall possess political-economic power of any sort whatsoever. Very evidently, political history is economically conditioned; but it is equally evident that at the same time the course of economic development is politically regulated. By focusing our attention upon the pseudo-problem of which sphere exclusively conditions the other, the absolutist deflects attention from the real problem, which is whether the individual should determine the political economy, *i.e.* the state, or be wholly determined by it. The question of liberty goes by default.

Behind absolutistic doctrine, and supporting it, stands universalistic or rationalistic philosophy, the most authoritative intellectual tradition of the past. Rationalism may be roughly defined as the view that all particular or individual character necessarily conforms to some definable system of natural law. Communism is perhaps the most thoroughgoing application to social and political life of this philosophy of natural law or universal necessity. Once we accept the premise of natural necessity, we are directly led to the conclusion that the human individual necessarily conforms to some pattern of social necessity, and that our aim should be the full realization of this pattern in the state or political economy. The state becomes identified with "universal being," over which the individual has no control.

What is the defense of the democrat against this rationalistic doctrine, which leaves to the human individual neither inviolable rights, nor political competence, nor in the last resort any intelligible status? The democrat must affirm the absoluteness of the individual, the ultimacy and the effectiveness of individual character. What socially transpires, he must say, is the end-result of a sum of individual actions, and not of any universal necessity; and he must affirm this to be true also of

rights, no inherent value. Conduct becomes moral only as it conforms to civic law. This doctrine provides no rationale for democracy, which conceives the individual to be the creator of law and the master of the state. The doctrine of Hobbes has supported every sort of political absolutism, and has finally issued in the totalitarian state against which our wars were fought. It is the creed of political absolutism.

But today, even amongst ourselves, this absolutistic doctrine propagates itself in a new and powerful form. Is not government an agency of the people, is not law the instrument by which society imposes its will upon all? If so, should we not look behind government to those popular or social movements which arise by natural necessity, and which proceed by this same necessity to surmount or overturn every obstacle to their progress? Must not the individual either conform to this social necessity or be destroyed by it? And are not they who perceive this inevitable trend of social change, and who identify their effort with its direction, at once authorized and compelled to assume the powers of government and to become the agents of natural necessity? Is not their ability to seize and maintain government the proof of their right and duty to do so? This is the conception of natural necessity which today undermines our faith in individual rights, and prepares the way for tyranny.

How escape this conception? We should see that the concept of natural necessity is simply incompatible with democratic faith. According to this concept the individual person or thing only seems to act freely—in truth, every individual reaction is determined by some universal necessity. The individual reacts in his own character, but his individual character is only the local and transient manifestation of a universal form or natural law. Individual character only seems to be individual, in reality it is generic or universal. Here, in this depreciation of individual character as unreal or unimportant, and in this elevation of generic character as real and important, lies the premise of

Must we, therefore, simply announce our preference for democratic government, saying that we just happen to like it better than totalitarian government; and should we affirm the postulate of individual freedom merely because it is logically compatible with democratic government, whereas the postulate of natural necessity is not? Is reason just a rationalization which makes explicit the implications of an irrational choice? No, we can elaborate the moral consequences or the ethical theories flowing from the two postulates. We may see that the very conception of value or goodness implies the power of the individual to make decisions and to acknowledge their effect upon his own and other lives. We may find that society is healthful only if the energies and intelligence of its individual members are morally and politically exercised. We may conclude that the democratic participation of each and every individual in government is the sole means of keeping government sensitive to the social pressures exerted upon it, so that all nondemocratic government is inherently unstable. These and other theoretical considerations may influence our choice of the postulate of freedom.

But what if the postulate, however preferable on moral grounds, should be simply untrue? Is not human society part and parcel of the larger world? Did not man emerge as the inevitable result of an evolution of planetary life? Did not organic nature merely complicate certain physical processes which antedated the appearance of life? And is not physical nature wholly necessitated, wholly uniform in its obedience to physical laws? Can we suppose that freedom emerged with man, or perhaps with the amoeba? Must we not conclude that the appearance of freedom is an illusion, hiding from us the fact of physical necessity?

It may seem farfetched to make our faith in a certain form of government depend upon a general philosophy which inquires into the character of everything that exists. Surely we are more cognizant of the nature and needs of man than we

stringency in the requirement that particular fact shall yield itself exactly and without residue to theoretical analysis. Things must be completely subject to natural necessity, it seemed, since otherwise we could not discover this necessity working in particular occurrence, nor define it in theoretical formulas. The real character of things must be their uniformity or likeness, and the apparent differences which individuate things must be illusory or meaningless. The human individual, a part of nature, cannot escape this necessity. Men, too, under their apparent individuality, must really be uniform and without essential difference. We are justified, therefore, in seeking the formulas which specifically define human character, and in imposing these formulas upon all individuals; for just insofar as an individual departs from the formulas, he cannot be said to be really human. He becomes unnatural or monstrous—if he can be said to exist at all.

In this way, by means of the concept of natural necessity, modern science has been employed to support political and other absolutism, and to discredit liberal theory and practice. Science has increasingly become the real faith of modern man, steadily displacing all other faiths; and if our faith in science commits us to the tenets of political absolutism, there is little point in continuing our lip service to liberty. This is why all moral, philosophical, and political controversy finally centers on a single issue: Upon which concept is science established, that of necessity or that of freedom?

The thought of the past, we said, inclined to the conclusion that science involves the postulation of natural necessity. The modern intellect derives from ancient Greece, and the great thinkers of Greece who inaugurated this philosophical inquiry into the implications of natural science were able to do small justice to individuality and freedom. In its main current, which flows through Plato and Aristotle, philosophy attributed to existing things only a small measure of freedom. Things might depart from universal form, it was held, only at the price of

After of morality and justice, by turning to criticism of the rationalistic philosophy which affirms the postulate of necessity. After criticism without positive construction soon degenerates into skepticism. It is not an accident that Hume, who first clearly saw the real issue and boldly questioned the dogma of natural necessity, is still known as a skeptic. It is not an accident that liberal and empirical philosophy has become increasingly confused, until today the very name of liberalism is in bad repute among intellectuals. Has the great tradition of liberty, which in the revolutions of the seventeenth and eighteenth centuries moved to the establishment of free institutions, lost substance, aim, and momentum? Is liberalism really discredited? Must we conclude that democracy is only the transition from monarchical tyranny to some other form of despotism?

It almost began to seem so. But, fortunately for ourselves and for civilization, there have occurred within this century certain revolutionary advances in the fields of logic and science, which turn the tables upon the authoritarian advocates of natural necessity, and which reestablish, we must believe conclusively, the philosophical principle upon which is grounded all liberty of thought and practice. These recent advances show the belief in mathematical and physical necessity to be groundless; and without the support of this basic necessity, the notions of chemical, biological, social, and other forms of necessity have little plausibility. We know today that not men alone, but all things, are free, even as Hume surmised. What looks like physical or other necessity is something else, the true identity of which awaits discovery. The postulate of natural necessity, we now perceive, was only a cover for ignorance of the causes of natural uniformity, and an excuse for not inquiring into these causes. Things are necessarily uniform, we said, and that is all there is to it. We can no longer say this. Every uniformity or conformity of individuals constitutes a specific scientific

is. After three thousand years of philosophical effort we arrive at philosophical truth; and we find it to be the truth which was already realized in the long evolution to a liberal culture and a democratic society. Practice anticipated theory.

It is to this philosophical truth, generative of a liberal and just civilization, that the student of philosophy is brought today. To convince oneself of its veracity, and to begin to grasp its intellectual and practical consequence, one must know something of the social and philosophical evolution leading up to its establishment. So studied, in the light of its issue in present truth, the history of western thought becomes much more than a chronology of thinkers, systems, and ideas. It resembles the dramatic history of some special science, each epochal stage of which is illuminated and made significant by the further advance to which it leads. The past is not just the past. In this world where time can have no stop, the past is the movement which issues in the present; and only in the light of its present issue can the past be known.

So we turn to an outline of the movement of western thought, disclosing the evolution of the human intellect. The issue of this progress is truth; but the passion which motivated the long progress was the passion for justice. That passion, which created all the worlds, now creates the world to come.

Notes for Further Reading

This book presents philosophy as a study seeking to establish a broad intellectual foundation for political faith. There are other approaches to philosophy, for example from science, art, mathematics, religion.

The prefaces or initial chapters of various histories of philosophy, and also the contents of various introductions to philosophy, may be used to study such varieties of approach. Several of these books will be found in any good college or city library, and the list below is intended to be suggestive only. Russell's recently published

I THE GREAT BEGINNINGS

2. THE STRUGGLE FOR JUSTICE

T ^{पुश्वा}HE GREEKS OF ANTIQUITY ARE OUR INTELLECTUAL progenitors; yet almost everything we look back to in Greek antiquity was the work of two short centuries, lying between 550 B.C. and 350 B.C., when Greek sculpture, architecture, drama, science, and philosophy reached their zenith. From that great and decisive beginning proceeded the continuous, remarkably self-conscious development which issues in the social and intellectual culture of today. Time and again, when men have lost their bearings, they have returned to that limpid stream of Greek life for guidance and assurance; and seldom have they come away unrefreshed. We may even do this still. Ancient Greece lives in us yet, in more ways than we know. Still the Greek thinker stands, a guide-post pointing the way we have come and the way we must go.

We have been taught, not least by the Greeks themselves, to think of the Greek truth as something timeless, suddenly appearing to hang forever like a great star in the firmament of the past. "There," we say, "was Greece!" as if we too believed that Athena had sprung in all her cool maturity from the head of Zeus. But Greece also, of course, had its origins, its infancy and adolescence. Of this long growth we know little. Suddenly the Greek genius found voice; and even as it sang, in

merchants of the inland sea. They kept alive their curious wonder at the strange customs of other peoples, a wonder which was to make them the observant analytical people they became and the creators of natural science. Above all they cherished their conception of what is right and proper in human government. They were fiercely individualistic, in the right sense of this word signifying a respect for individual being everywhere, a sentiment which is the contrary of mere egoism. This sense of the value of the human individual they translated into the political conviction that government should be by law. They believed that individuals may subject themselves with dignity to a common law, but only with indignity to the fiat or whim of a personal ruler.

Settled on sea-girt islands and promontories, or in mountain-girt valleys and narrow littorals, the Greeks never became a nation. Their creation of governmental mechanisms was never so far developed as to show individual liberty to be compatible with large community. Only in the small sovereign city-state, they agreed, could a citizen actively participate in his government. So the fierce love of liberty became identified with a fierce loyalty to the city, precluding all larger political unity; and upon this rock of isolationism the Greek people foundered.

When the historical record begins, Greek society was already suffering from the consequences of this limitation. Cities economically favored by location had grown great; they had become wealthy in trade; and they had attracted increasing numbers of resident aliens who remained unfranchised, so that citizenship became an hereditary privilege and a segregative power. There appeared in such cities two factions whose political opposition reflected a radical divergence of economic interests. The landholders and farmers, citizens impoverished by a commerce which enriched all but them, were conservative or reactionary, resistant to change, doggedly jealous of their ancient rights and privileges, and convinced that they alone truly represented civic tradition and just law. They upheld the

cultural unity. The cities now formed a loose confederation, at first under the direction of Sparta, whose militant way of life seemed to qualify it for this leadership; but it was the flexible genius of the Athenians, with their stout and clever sailors, which at Salamis in 480 B.C. secured definitive victory over great Persia. Athens was now commissioned by the confederation to keep intact the naval power, since Persia still threatened. After a brief struggle against jealous Sparta, Athens assumed what was virtually a hegemony over the Greek cities, placing their contributions in its own treasury and seeking to bring cases of dispute to its civic courts. Sparta, militant and reactionary, was able to foment rebellion against progressive Athens on the ground, apparently justified, that Athens abused its commission and was aiming to subject all of Greece to its imperial self.

The brilliant, unforgettable half century following the Persian War produced the architectural masterpieces, the deathless tragedies, the incomparable sculptures that still symbolize classical Greece. Then, in the long, increasingly brutal, and ruinous Peloponnesian War, which according to realistic Thucydides changed the very soul of Greece, that lyrical, gracious, energetic, and free spirit was darkened and all but destroyed. The cities which Persia could not conquer destroyed one another; and the Macedonian who waited in the north came down to subjugate them all, and turn the world barbarian again.

One must not draw too close a parallel between the rise and fall of the Greek cities and the present ruin of Europe after a century rich in achievement. Yet it would be a worse error to recognize the forces which first stimulated and then destroyed Greece, and not to see these same forces working similar destruction in the modern world. The basic failure of Greece was its inability to advance to a just and stable political union, giving to all of the Greek cities a due share of political power and economic benefit. This failure in its turn was due in part to the imperialistic presumptions of Athens, and in part to the

gram in definitely moral and religious terms, and to distinguish their pursuit of liberty from license and laissez-faire. Their opponents, on the other hand, could point to an explicit ideal, realized in civic history and civic practice, and calling only for an obstinate fidelity.

Thus the fall of Greece is a major demonstration of the importance of political, moral, and religious forces in social evolution. If Greek history had been merely an economic development, the Greek people would have been irresistibly drawn to political unity. It seems evident that the majority of Greek citizens were so impelled, their economic interests driving them that way. But the small groups whose economic interests were endangered by this movement were able to call into play very definite political and moral forces which worked against the economic trend. They were able to persuade the Greek people to sacrifice economic interest to patriotic pride, moral integrity, and religious piety. And they succeeded, in spite of the narrowness of their social ideal, in holding back the tide of progress.

How could the progressives have undermined and overcome the resolute, uncompromising fundamentalism of their conservative opponents? Only by advancing to a larger political, moral, and religious vision, retaining what was strong, clean, honest, and true in the old faiths. The Athenians, for example, believed that their austere and beloved Pallas Athene was the daughter of Zeus, sprung from the very head and intelligence of that father of the gods. How could the Greek people be brought to worship Zeus himself, their common god, without these local intermediaries? How could they advance to a justice, a law, a morality and religion that was one and the same for all Greeks? This was the question to which the ancient Greek philosophers applied themselves; and out of their thought proceeded Greek science and ethics.

These men were not able to save Greece; but they began the movement which may save posterity. Their work falls into two distinct phases. The earlier thinkers had in mind primarily

implied, as does some contemporary humanism, a repudiation, implicit or explicit, of the religious foundations of being. All Greek literature, all truly Greek science, is repeated warning against the thought that human life can be humanly lived in neglect of its religious sources, and that respect for man excludes religious faith. Most intellectual of all the ancient peoples, the Greeks were also the most deeply religious. We can best understand this Greek outlook, at once humanistic and religious, by a study of the work of Aeschylus, greatest poet of the Greeks, in whose bold thought lies an insight common to all the great prophets of the past.

Aeschylus, who fought at Marathon against the Persians in 490 B.C., returned to Athens to create the Greek theater and to establish his own fame as one of the supreme dramatic poets of all time. Of his many dramas, most are lost; but we possess the great trilogy portraying the death of Agamemnon and its fateful consequence. The story really begins earlier, when Agamemnon, king of Mycenae and leader of the fabulous expedition against Troy, sacrifices his daughter Iphigenia to win a favorable wind for his fleet. His wife Clytemnestra does not forgive this ambitious violation of domestic love. She takes a lover, sets him on the throne beside her, orders the destruction of Agamemnon's son Orestes, and demeans his daughter Electra. When Agamemnon returns victorious after the ten-year siege of Troy, his wife murders him in the ceremonial bath. Orestes, saved from death, grows up in exile under the admonishments of the god Apollo to avenge his father. Come to manhood, he returns secretly to Mycenae, and meets Electra at their father's tomb. In the most moving and profound moment of the drama, these youngsters pledge themselves to their dreadful task. Orestes slays his mother's paramour, and then, on those same palace steps up which Agamemnon had gone to his doom, he lets quick death cut short his mother's appeal to filial duty. Driven now by the Furies of remorse, Orestes wanders mad over Greece. Apollo leads him to Athens, and

to divorce justice from righteousness, politics from religion. The laws of human society are not just if they are less merciful than the law of Zeus, giver of life.

What Aeschylus said in great drama and high verse, Greek science repeated in sober but convincing prose. A century before Aeschylus, great Anaximander had written that things "return of necessity" to the chaos whence they had come as "punishment and reparation to one another for their injustice, according to the order of time." This is still the law of tooth for tooth, of crime for crime; but Anaximander is already pointing in his cosmology to a larger law, which Socrates and Plato would show to transcend the earthly passage of crime and punishment.

Notes for Further Reading

A wealth of literature exists to illustrate the Greek milieu in which science and philosophy developed. There is a dearth of studies, however, relating the development of science and philosophy to the political achievement in which the Greek intellect had its first exercise and expression.

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4. Cornford, F. M., *From Religion to Philosophy*. Boston, Longmans, Green and Company, 1912.
5. Barker, E., *Greek Political Theory*, 2nd ed. London, Methuen and Company, Ltd., 1925.
6. Bury, J. B., "The Age of Illumination," *The Cambridge Ancient History*. New York, The Macmillan Company, 1927, Vol. V.
7. Sabine, G. H., *A History of Political Theory*. New York, Henry Holt and Company, 1937, Part I.
8. Zimmern, A. E., *The Greek Commonwealth*. London and New York, Oxford University Press, 1922.
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and Egyptian industrial cities, its development cannot be explained as an economic phenomenon.

Science of a sort, we know, existed earlier and elsewhere. *Thales of Miletus*, the father of western science, is said to have learned his geometry in Egypt; and his prediction of the solar eclipse of 585 B.C. testifies to his access to astronomical records covering some centuries, accumulated perhaps in Mesopotamia, where astrologer-priests had long plotted the sky. But we ascribe the creation of science to Ionian Greece because it was there that the study of natural phenomena was undertaken, as we say, "for its own sake," with an increasing recognition of the universal scope, the theoretical unity, and the distinctive method of science. Science arose, in short, as a philosophical enterprise which pursued nothing less than a comprehensive knowledge of the universe in its entirety.

It is unfortunate that we have so little firsthand knowledge of these great Ionian pioneers. Of their actual writings and sayings we possess next to nothing, all our knowledge being hearsay. Our chief source is Aristotle, who included in his writings a short account of his more important predecessors; and Aristotle wrote not as an historian, but as a special pleader who wished to show how all earlier science pointed to his own conception of nature, or miserably failed where it did not. His account of his predecessors is consequently somewhat misleading. Unfortunately this work of Aristotle was religiously accepted as an impartial record until very recently, and its misinterpretation has colored every conception of Greek thought down to the present time.

Aristotle believed that his own most important contribution to science was his doctrine of substance; and he accordingly interpreted each of his predecessors as presaging, more clearly or more dimly, his own view. Thus the history of Greek science became in his hands the account of a search for the underlying and universal substance which inheres in all things. But to understand the Ionian pioneers of science as merely

the aristocratic Homeric pantheon some of the ancient local deities, indigenous to Greek soil and dear to the farmers for whom he wrote. But Hesiod too, even by his effort to revitalize the Olympian myth, betrayed his awareness of its inadequacy and assisted in its obsequies.

The Milesian progenitors of science boldly departed from this venerable but decadent mythology. They sought a new vehicle for the expression of their religious faith and for their perception of the religious unity and meaning of the world. Of this moral and religious motive, in them become realistic, was born their science. They used their extended knowledge of fact, and their deep concern for the moral and political well-being of man, to create a new form of religion, so different from other religious symbolisms that it has usually been contrasted with religion. Yet it was religion, because its motive was religious. Let us examine for a few moments the thought of Thales, Anaximander, and Anaximenes, citizens of Miletus, who initiated the development which was to become science and philosophy.

Of *Thales*, who "flourished," as the Greeks were wont to say, about 600 B.C., we know little. A leader who vainly appealed for a confederation of Greek cities to meet the menacing power of Persia, a navigator and astronomer, he evidently elaborated a cosmology the chief lines of which were retained by his Milesian and later successors. If, as reported, he said, "All things are full of gods," he presumably was proposing a realistic and empirical study of the forces inherent in things, since "gods" meant nothing less than "effective powers." If he said, "The lodestone is alive, because it has the power to move iron," he presumably pointed to a rather striking instance of this power inherent in all things. Thales proposed, in short, that we should recognize and acknowledge effective and forceful being wherever it appears, and not only on Mount Olympus, the home of the Homeric divinities. If he said, "All things are water," he evidently had in mind a cosmic process in which

realm of which everything articulate proceeds, and into which it again returns.

But we need not be too much concerned with how Anaximander developed his conception, nor even with what the conception exactly was. More important is the sort of conception, the general approach and method, involved in this new speculation. We see here a sustained effort to conceive of nature as a single, continuous, and self-regenerating process. We see, in short, the inauguration of mechanistic science. The mechanism of natural change, Anaximander taught, is always and everywhere simply that of separation and commingling, *i.e.* of spatial displacement. Physical science has followed this direction of thought from that day to the present.

Anaximander developed his mechanistic hypothesis on a grand scale, with superb genius. He conceived not only things, but worlds or "universes," to generate and disappear again "*in the fixed order of time.*" The initial separation of heavier from lighter elements, he thought, would generate a great vortex or whirlpool, with the moist earth at the center and the fiery sun at the periphery. The action of heat on moist earth would then generate living organisms, first simple but increasingly complex, man appearing as a late mutation from the fish. Unfortunately this evolutionary conception was later submerged by a more static conception of nature, and not recovered until the close of our eighteenth century.)

But most important and revealing in Anaximander's cosmology, and as a rule least emphasized, is the teaching contained in the authentic fragment which we have quoted. "*Things pay a penalty and recompense to each other for their injustice in the fixed order of time.*" The conception of the change and movement of nature as only a spatial separation and commingling is a purely mechanistic conception; but this conception of spatial process is only one half of Anaximander's science. It needs to be supplemented by an appreciation of "the fixed order of time," *i.e.* the temporal dimension of fact;

suggest that he really conceived of a single substance, appearing in four different degrees of density. It must be remembered that these Milesian thinkers had no idea of empty space. They believed that the atmosphere extended indefinitely, until it reached the celestial firmament or "fire." Nor did they distinguish air from water vapor, the latter being for them only very moist air, and air only very dry vapor. So the clouds were "felted air," according to Anaximenes.

Aristotle says that Anaximenes made air the original element, the others being formed by its rarefaction or condensation. There seems no reason why one element should be so distinguished, since the cycle of transmutation goes on eternally. But Anaximenes probably started with air, since for him it occupied most of space, in his description of the cyclical change. He may have further characterized air, since he said "*Just as our soul, being air, holds us together, so do breath and air encompass the universe.*" This statement informs us that these Milesian scientists did not distinguish organic from inorganic processes, as we do. They did not conceive of a physical world devoid of life and organic character. Yet apart from the above statement, we would call Anaximenes' description of nature a purely physical description.

We have concerned ourselves here only with the largest conceptions of these Milesian thinkers. We know that they were active and productive scientists, pursuing special studies and advancing special hypotheses in many fields. Thus Anaximenes elaborated hypotheses on the origins of wind, rainbows, and earthquakes; he developed an astronomy according to which the heavens rotate like a cap or bowl about a disc-shaped earth, to produce the apparent rotation of the constellations about the pole-star. But we shall not refer to such special studies except where they involve a new direction of thought and a new approach or method in the prosecution of science. What distinguished these Milesian thinkers from earlier speculators was their combination of a realistic observation of matters of

law. It was incumbent upon these Greeks, when their free institutions were menaced by external attack and internal crisis, to assure themselves of the righteousness and propriety to nature of these institutions; and they sought this assurance in a conception of nature which affirmed nature to be everywhere governed by "natural law," a conception which stretched Greek justice to the end of infinite space.

Was this procedure, which has been justified by the continuous development of the natural science it initiated, really less anthropomorphic than the earlier mythology? If the Olympian pantheon saw in nature a feudal hierarchy of personal divinities, did not this new cosmology extend to all of nature the pattern of human relations characteristic of the Greek city-state? We shall see that the concept of nature, even in its most objective and scientific elaboration, has never ceased to be intimately related to the social and political habits of men. We shall find, indeed, that our conception of external nature so overlaps our conception of human nature that it is impossible to draw a sharp line dividing man from his natural environment, or to make our studies of man and of nature reciprocally exclusive. The studies of man and of nature have mutually and profitably conditioned each other. The perception of human relations first quickened the perception of the connections among things, and a better understanding of things then implemented our understanding of man. The word "anthropomorphic" is used to discredit any conception which interprets nature by analogy with human and social processes; but it is doubtful whether we can ever reach a concept of nature not open to this criticism. Such criticism is perhaps hypercriticism, in that it overlooks the continuity which relates man to his larger environment. "No art but nature makes that art," said Shakespeare.

This Milesian science initiated directions of thought which it could not follow very far, and raised theoretical problems which it did not clearly see. Its crucial problem was the rela-

surface of sixth and fifth century Greece. It was a period which saw many new forms of religious expression and organization, but these movements break through the surface of recorded history only here and there. They appear in some of the great tragedies, *e.g.* in the *Bacchantes* of Euripides, and in certain otherwise obscure developments of science and philosophy; and they must be called upon to explain the steady drift of Greek thought toward its issue in mystical Neoplatonism and Christianity. The movement was a popular one, constituting an appropriation of religious authority by the people at large, and suggesting withdrawal from the established faiths which had become identified with certain political institutions and ruling groups. These "mystery-religions," as we call them because they usually centered in some purifying and redeeming sacrament, often claimed only to recover faiths immemorially old; but there is little doubt, whatever their historical origins, that they constituted new developments of religious speculation appropriate to their age. An important shrine was at Eleusis, outside of Athens; and it is interesting to observe that official Athens tried to identify the Eleusinian mysteries with itself, as a means of influence over the Greek people.

Pythagoras does not seem to have made any claim to antiquity for his cult, but seems rather to have presented it as a new revelation of truth. In the lodges which he founded, communities of men and women embraced a strict discipline of life and thought, accepting the authority of their tutors, and seeking to advance through well-defined stages of moral and intellectual illumination. In their self-government and self-discipline they resembled a medieval monastery, as they did also in their communistic economy. Less clear is the relation of the lodges to the society outside of them. For a time they exercised authority over the cities of southern Italy; but ~~that~~ came revolt, with Pythagoras forced into exile. Later ~~he~~ gained power, but only to be destroyed by a persecutions would dispersed their members and their beliefs over mudelligible being,

motive with religion, something we no longer find it easy to do. For Pythagoras the scientific pursuit of knowledge was a religious pursuit of truth, bringing emancipation to the soul. And still it is, if we would but know science in its wholeness again.

Music served in this Pythagorean doctrine to bridge the distance between moral and aesthetic art and descriptive science. The lilt and fall of melody, the thrill of harmony, depend on intervals of pitch which in their turn are conditioned by the mathematical proportions of the instruments used—by the lengths of string in the lute, by the spaced holes of the flute. The form and substance of music is its proportion, its measured pattern of tone. Similarly Greek architecture, sculpture, and verse were of the classical sort which looks to symmetry, proportion, and repeated measure. It was this classical art which Pythagoras pursued in his puritan discipline of the individual life, in his disposition of the communal life of the lodge, and finally in his scientific exploration of earth and heaven. The essential form of every sort of being, he taught, is its mathematical form. Mathematics is the key to every secret of nature and of life.

So, with the Pythagoreans, science became consciously and emphatically quantitative, mathematical, precise. Exact science was born; and even among the Pythagoreans this mathematical science, both pure and applied, advanced to most notable achievements. Nor may we believe that any spiritual hunger less acute, less intense, or less abstracted from the world than this Pythagorean quest of supreme deliverance would have sufficed to establish firmly, so that it should never again be lost, this so theoretical and "impractical" wisdom, this mathematical science which has revolutionized human practice, and which has made of our modern industrialized world a monument to pure theory.

From that day onward, the study of mathematics would foster the belief in a realm of ideal and purely intelligible being,

what difficult to grasp. They conceived of every number as having a definite geometrical shape. For example, there were "square" and "oblong" numbers; and the number ten was conceived as a pyramid, made up of four levels containing respectively four, three, two, and one units. The unit of number was conceived as a volume possessed of spatial size; and they accordingly did not sharply distinguish arithmetic from geometry. Indeed, they took all science to be essentially the science of numbers, since they supposed every distinct sort of thing, and even every distinct sort of natural occurrence, to have "its number," to know which was to know the essential character or true form of the thing. Thus there was one number which was the horse, another which was man, another which was marriage, and so forth. But we should expect these errors, to us whimsical, in the first groping but prescient sketch of what was to become the universal mathematical science of today. Nor were the Pythagorean scientists prevented by their quaint numerology from mighty achievements in arithmetic, geometry, and astronomy. The mathematics and astronomy with which modern science began was essentially their creation. From the Milesians, and through these mathematical Pythagoreans, came the systematic study of nature of which modern science is the faithful development; and about this backbone of authentic theoretical science was incorporated all later thought. One can hardly overestimate, therefore, the influence of Pythagoras upon the intellectual development of man.

Scarce, less important was his influence upon human practice. His communal ideal was developed by Plato, through whom, as well as more directly, it influenced all later political thought. This ideal was variously pursued in the monastic movements of later antiquity, in the ecclesiastical system of medieval Christianity, and in the orders of the Knights Templar and Rosicrucians, through which it came into Freemasonry and ~~even into~~ to the college fraternity, which still curiously pre-

Notes for Further Reading

Prior to this century, the historian chiefly depended for his knowledge of early Greek thought upon Aristotle's account of his predecessors. Today he has at his disposal the "fragments" consisting of quotations and references to the earlier thinkers gathered from later writings. The task of reconstructing the thought of the philosopher from these fragments is a difficult one, comparable with that of the zoologist who "reconstructs" an extinct animal on the evidence of a few fossils. The best introduction to this field of scholarship for the English reader is probably the writings of John Burnet.

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6. Gomperz, Th., *The Presocratics, Greek Thinkers*, trans. L. Magnus. London, J. Murray, 1905, Vol. I.
7. Cherniss, H. F., *Aristotle's Criticism of Presocratic Philosophy*. London and New York, Oxford University Press, 1935.
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vast economy, things being subject to a universal law even as Greek citizens were willingly subject to their civic laws. All change, Anaximander taught, is the working in nature of universal justice, which keeps things within their proper bounds of space and time, yet gives to each its due. This moral conception was given a more concrete and material expression in the notion of a world the constituents of which are in flux, always coming and going, yet which preserve in their totality a constant balance and design. Thus the measures of water which become air are balanced by measures of air which become water or fire, the quantitative distribution of nature remaining unaltered. This notion is not easy to work out in detail. Anaximander, we saw, needed a sort of fourth dimension, the indefinite, in order to explain change. In his view there is no change except that by which things emerge from or vanish into this medium. Anaximenes had explained all change as rarefaction or condensation—but a rarefaction and condensation of what? Of some one of the four types of being, or of some underlying stuff with four recognizable densities? Is ice frozen water, or is water melted ice? Or are ice and water both phases of some underlying substance? And in the last case, what is this substance in distinction from its variable appearances? The Milesian science raised several problems of this sort, because of the desire to see in nature, at one and the same time, both a process of change and a preservation of something elemental and changeless.

Heraclitus of Ephesus, a city which lay to the south of Miletus on that same Ionian coast, early in the fifth century concerned himself with these problems; and the conclusion he reached makes him the first consistently *dynamic* thinker in history. It is neither necessary nor possible, Heraclitus concluded, to conceive of ultimate substance. If there is real and universal change in the world, and there evidently is, there can be no real substance; for by "substance" we mean just what does not change. What is conserved within change, Heraclitus

The full implications of dynamism, indeed, are scarcely clear today, as we shall discover in our concluding chapters. What does it imply when we make change the most basic and irreducible character of nature? Something we call *A* becomes something we call *B*. If *A* and *B* constitute our perspectives upon this change, *A* being our view as we look back to its beginnings, *B* our view as we look forward to its terminus, then the sole reality confronting us is the process *AB*. But now let us universalize this conception, and think of vast reality itself as a process which is known only in its forward sweep, *AB*! We reach a conception of evolution so radical that neither Darwin nor any other scientist has yet thought to embrace it, and so disturbing that no philosopher has yet steadily contemplated it!

Heraclitus did not proceed so far along the trail he was the first to blaze. He still subscribed to the Milesian cosmogony, which conceived the solid earth to be enclosed in permanent envelopes of water, air, and ethereal "fire." To get back to this self-contained cosmos, he conceived all changes to proceed reversibly, between two poles or opposites. "*Fire lives the death of air, air lives the death of fire,*" he said, meaning that there is in nature a downward and an upward movement, a reversible process, which we call "fire" in its upper limits and "air" in certain lower stages. Heraclitus also said, much as did Anaximander, "*Mortals are immortals, the one living the other's death and dying the other's life.*" This would seem to imply the immortality of a nonsubstantial soul, our birth and growth being our gradual transference from some other shadowy realm; and similarly our aging and death would restore substance to something in that other realm.

Heraclitus' controlling purpose, we must believe, was to save and give force to the conception of universal justice which Anaximander had magnificently affirmed. According to Anaximenes, all change is the condensation or rarefaction of something indestructible; and this would mean that all change is merely the redistribution in space of this indestructible matter. But a science which reduces all change to material displace-

than outweighed by an intense and, in terms of his own doctrine, literally burning faith in the intellectual power of man. All being, he taught, is some sort of flame; and in man this flame burns brightest in the intelligence. We know, he said, three stages of being. There is sleep, there is ordinary waking, and there is the completely awakened life of intelligence, which has to ordinary experience the relation this latter has to the fitful dream-life of sleep. "*All things we see when awake are death, even as those we see in slumber are sleep . . . It is not meet to act and speak like men asleep.*" In its full wakefulness, the spirit of man knows the cosmos and its divine tension. But man seems to fear this dry, flamelike life of intelligence. He prefers even to quench the flame in liquor, and to "*go tripping, having his soul moist.*" The call to intelligence is also a call to moral living. In dream, each man enters an idiosyncratic world private to himself, woven of his personal memories and desires; in ordinary waking, he shares a common perceptual world with his fellows; only in the elevated life of thought does he fully enter into "*what is common.*" "*The many live as if they had each an understanding of his own . . . Those who speak with understanding must hold fast to what is common as a city holds fast to its law, and even more strongly; for all human laws are fed by the one divine law . . . Wisdom is one thing, it is to know the thought by which all things are steered through all things.*"

Heraclitus established no school, perhaps because his conception outranged the accustomed limits of the Greek mind; but his thought had broad influence upon all the later intellectual development. His most important contribution, the concept of an intelligible form which is the measure of change, and which is itself nonsubstantial, was recovered and firmly established by Plato.

Parmenides of Elea, living, it is believed, a generation later than Heraclitus, until about the middle of the fifth century,

were committed to the view that nature is discontinuous, since they understood all things to be numbers made up of discrete units possessed of volume. The Eleatic followers of Parmenides elaborated arguments which reduced this view to self-contradiction and absurdity. Whether or not the Eleatic system originated in these mathematical problems, it certainly carried to its extreme conclusions the opposite view, which denies the discrete or discontinuous character of nature. The Eleatics believed that nature is truly one, solid, infinite, without vacuum, without diversity, without change, without motion. Any other conception of nature, they taught, ultimately leads to the affirmation of discontinuity, with all its consequent absurdities.

The writings of Parmenides, taken by themselves, would suggest another origin of this Eleatic philosophy. "*What is,*" goes the refrain of his poem, "*is identical with what can be thought.*" "*The way of truth,*" in short, is the way of the intellect; and "*the way of opinion,*" i.e. of error, is that which puts its trust in the senses. The evidence of the senses and the evidence of reason conflict; we must choose between the senses and reason; the senses lead us to self-contradiction, reason gives us coherent knowledge; so we must resolutely reject sense-evidence, and cleave only to reason. The Eleatics dismissed, as a realm wholly made up of illusions, the world which appears to us in ordinary perception. So Parmenides may have been only too loyal to the most essential doctrine of the otherworldly Pythagoras. It is not easy, in our empirical and naturalistic age, to sympathize with this sheer, uncompromising Eleatic rationalism—only an occasional thinker subscribes to its logic today. But we should appreciate its service to the development of science and thought. In the fifth century B.C., it must be remembered, science was still struggling to establish itself as a method of inquiry reaching authentic natural knowledge; and it was becoming evident that science reaches conclusions far removed from those of current opinion, and sometimes rather directly contrary to common sense. Would men accept

may and must be incorporated into some self-consistent theory. The other, which is really only the first differently stated, says that a theory is acceptable only where it violates none of the known facts. But what is "self-consistent theory"? Logic is the large answer to this question. And by what right does the theoretical scientist require the facts of nature to fit into some theory? Why should they not refuse to conform to any and every theory? Philosophy is the long answer to this question. It is no wonder that Plato, the greatest intellect of antiquity, esteemed Parmenides the most among all his predecessors; for Parmenides was the first thinker clearly to perceive the four following facts: one, man always and necessarily brings certain presuppositions to his perception and understanding of nature; two, these presuppositions are somehow included in all his description of nature; three, these presuppositions constitute a purely rational, nonempirical or nonobservable factor in all natural knowledge; four, these presuppositions point to some peculiar and profound relationship between nature and the mind of man.

What can be, said Parmenides, is what can be thought. And what can be thought? Thought, said the Greek, is theoretical science, reaching a theory which defines, we may believe, the real, permanent, and universal character of nature. In appearance nature is diverse, variable, shifting, particular, chaotic. To theoretical study, however, nature is one, same, constant, universal, perfectly formed. Which shall we believe, the senses or the intellect? If you are going to think at all, said Parmenides, think consistently and believe in your thought! Believe that nature is in truth that one, same, inflexible, and whole Being which your theory describes! This conclusion, which identifies thought with *theoretical* knowledge, which prefers reason to the senses, which attributes "real being" only to universal character and which dismisses particular and transient character as sense-illusion, we properly call *rationalism*. Parmenides inaugurated rationalistic philosophy. In so doing, he

its Milesian and its Pythagorean forms; and it was especially directed against the dynamic conception of Heraclitus. The older science found defenders, however, in the atomists, who turned the edge of the Eleatic criticism by stoutly affirming what Parmenides had called inconceivable, the existence of empty space.

A certain *Leucippus*, who journeyed from Miletus to Elea and later settled in Abdera in northern Greece, first clearly enunciated the principle of atomism. "*What is not*," he said, is as real as "*what is*." There is empty space; and the positively characterized sort of Being required by Parmenides exists in the form of small atoms, indivisible and eternal as Parmenides supposed, but moving in the void. Of Leucippus and his teaching we know little; but the doctrine was elaborated in much detail by his great disciple, *Democritus of Abdera*.

Atomistic theory has been of great importance in modern science, because it can be applied with quantitative methods allowing mathematical calculation. To what degree the Greek atomism was mathematical we do not know; it did not establish any mathematical tradition. It did presuppose, however, the reduction of all qualitative character to quantitative spatial differences. The atoms, Democritus taught, are all of the same stuff; but they differ in size and shape, which results in differences of motion. All the observable qualitative difference and change of nature, excepting of course the qualitative difference between this atomic stuff and pure space, is due to the various dispositions of atoms in space. Some of the atoms have jagged edges and cohere firmly together; others are smooth, and flow freely as liquid or air. Smallest and smoothest of all, and therefore speediest and most penetrating, are the atoms of light, the movement of which Democritus identified with consciousness or intelligence.

In this atomistic doctrine, Greek science approached as near as it was to come to the mechanistic science of today. It postulated only "atoms and the void," the atoms being endowed

today, is based upon false suppositions. Heavy atoms would not fall faster than light atoms, atoms would not "fall" at all in empty space. But there was one presupposition that entitles this Greek atomism to respect, and which made it the influential and profitable conception it was to become in modern science. This was its demand for completeness of explanation. Everything in nature, it insisted, happens of necessity, with adequate cause. Each stage of nature is *completely* determined by the preceding stages, and *completely* determines the succeeding stages. This insistence upon the complete and perfectly intelligible determination of events by events outweighs all the errors of the Greek atomism. It was this rigorous requirement, suggested certainly in part by Greek atomism, which made modern science the rigorous and effective mode of analysis it is. The doctrine that there is no chance in nature has recently come into question; but it was this doctrine that chiefly aided modern science in its advance beyond Greek and medieval science. We owe much to these men.

There were two other forms of atomism, or at least approaches to atomism, of sufficient importance to warrant mention here. *Empedocles of Acragas* in Sicily, a younger contemporary of Parmenides, elaborated a system which supposed that four different kinds of being (the familiar earth, water, air, and fire of the Milesians) might be conceived to be eternal and indestructible, yet to be finely divided into parts which move concurrently, without the supposition of empty space, much as the parts of water may be swilled in a bowl. All things would be explained, in this prototype of modern chemistry, as compositions of these four elements, atomically divided. Empedocles had discovered by experiment that air, which the ancients conceived to fill the space between earth and the "fiery" heavens, is a material body; and this encouraged him to believe, in spite of Parmenides, that motion is not incompatible with a solid or filled Being, and with the denial of a vacuum. Earth may move in air. He still required some source

indeed he holds it to be infinitely divisible, which was the logical alternative allowed by the Eleatic argument. This bold step allowed him, he believed, to save all the change and apparent diversity of nature from the destructive Eleatic criticism. The substantial being of the world, he agrees, cannot change; but this being may exist in infinite qualitative modes, in all sorts of mixtures of these modes, and in changing mixtures of them. Everything will contain some proportion of every mode; but it will appear to us as that mode of which it contains most. Thus a white object contains much white, but also a trace of every other color, even of black. Copper is mostly copper, but everything has in it a little copper, and copper has in it a little of everything. This seems to us a rather curious and scientifically useless theory. Its virtue, apparently, was that it allowed the scientist to trust his senses, while at the same time it admitted that there could be no change of substance, since Parmenides had shown such change to be inconceivable. Like Empedocles, Anaxagoras needed some agency, distinct from these immutable qualities of nature, to mix and unmix things. He postulated therefore *Nous* or intelligence, a nonsubstantial agency responsible for all motion, and the true ruler of the world. Plato makes Socrates complain that Anaxagoras called *Nous* the controller of the world, but that when he treated of any actual occurrence he explained it mechanically, as a result merely of the push and pull of things. Perhaps we should understand Anaxagoras to have subscribed in general to the science of Anaximander, with some additions of his own which were intended to meet the Eleatic criticism.

In truth, the Milesian science seemed to be self-contradictory. It supposed that the happenings of nature are at once the result of a cosmic purpose, and the necessary and intelligible result of the impingement of the parts of nature against or in each other. Since our own science also shows this apparent contradiction, we cannot be too rough with the Milesians and their apologists. Science, we shall find, does not

lowers failed to explain was the "illusion" of change. Change is real enough, it is a feature of the world. Plato, understanding Parmenides, would correct this failure.

It may seem strange that in all antiquity there should have been only two or three men able to grasp this large but simple thought of Parmenides. But we shall find, as we proceed with this study, that there have been only some half-dozen basic thoughts in all of this intellectual history—the bulk of philosophical speculation is the weaving of these few thoughts into new combinations and modes.

restoring in new and powerful form the moral insight of free Greece, instead of showing that the just law of the city-state only administered the larger law of nature, the new science seemed to issue in something unintelligible and morally vacuous. During the second half of the fifth century there spread over the Greek world a blight of sophistry that was in part an enthusiastic but superficial absorption of the new science, in part an open or furtive rebellion which used the new science to discredit what was sober and sane in Greek life. Heraclitus was employed to justify a cheap subjectivism or relativism, making each individual his own truth and his own law. Parmenides was used as a model for clever logic-chopping, which reduced every familiar or established truth to apparent absurdity. The atomistic science could be used to discredit everything but the crassest egoism. This sophistry and skepticism threatened the very existence of Greek society, and consequently it produced a strong reaction against science. Now that the old religion was no longer effective, only science remained to save Greek society. There had to arise, if science and society were to be saved, a man who could make clear the moral foundations of science. Such a man was Socrates.

The sophistry and skepticism of the later fifth century would have not been so dangerous, if Greek society had not already been thrown into economic and political ferment. Their high optimism, which had carried the Greek cities to economic expansion and to victory over Persia, became confused and reckless when the Greeks found themselves confronted with problems of political and economic reconstruction, now acute and not to be postponed; and the forces which should have carried Greece to political unity were dissipated in civic conflict and abortive revolution. The sophists exploited these social and political tensions. They were usually clever but irresponsible men, often without fixed political or other ties, who traveled as teachers, publicists, and dispensers of the new learning from city to city, turning their little knowledge to pecuniary profit.

opinion—beyond opinion we cannot go. But whose opinion? That of the expert, surely. And who is the expert in this matter of the good life? Well, Protagoras suavely suggested, the expert in this domain is the able and personable individual whose *savoir-faire* is his fortune; and for a goodly fee, Protagoras would transmit his own worldly wisdom to the children of his auditors. Protagoras with his eloquence and engaging personality moved through the wealthier Greek cities, filling his lecture hall and his purse.

Not a bad fellow, as Plato allows in his satire, was Protagoras. Bluffly kind and shrewdly suave, he used a superficial skepticism to expound the truth that what a man can teach, in the last analysis, is only himself. But what is man—an opinion, or a truth? "Man is the measure of all things" can be a profound saying, as Socrates was to show. But in the mouth of Protagoras the phrase was something less than profound, since it elevated personal talent above a common truth and a common faith.

Another sophist, the Sicilian *Gorgias*, also famous for his oratory, carried this relativism to its final implications in a skepticism virtually complete. If knowledge is only the opinion induced in us by temperament and environment, what basis of judgment among differing opinions can we find? Why is expert opinion best, or today's opinion better than yesterday's? The only criterion Gorgias could find was that of immediacy. We are certain of what we now immediately sense or feel. But such sensation, stripped of all conceptual understanding, is incommunicable, ineffable. We can know the truth only if we do not speak it; to speak is necessarily to lie.

Socrates was by many of his contemporaries, almost certainly by those who encompassed his death, accounted just another sophist. He resembled the sophists in his love of logical acrobatics, in his love and distrust of the new science, and in his demand that knowledge should have practical use. He differed from the sophists in his refusal to exploit intellectual

Athens and seeing it bent upon false courses, he devoted his life to arousing in others, especially in the Athenian youth who looked to him for entertainment and guidance, a moral fervor for the salvation of themselves and their city. In this work he neglected his private fortune, but found great satisfaction. Like his mother, who brought bodies to birth, he said, he was midwife to men's thoughts. He wrote nothing because he believed that a disciple is a living book, much more effective than a written word that cannot answer back.

What was his teaching? The soldier-author Xenophon gives us anecdotes about the man. Plato puts a whole philosophy into his mouth. Aristotle, whose biased reports of his predecessors usually misrepresent something factual, says that Socrates invented the method of definition; and this is a real clue. We know that Socrates was famous for his irony, that he was addicted to dialogue with short questions and answers, avoiding rhetoric, and that he identified virtue with understanding, vice with ignorance. When we study clues of this sort in the light of the philosophical development which he so powerfully influenced, we are led to certain broad conclusions concerning the Socratic teaching.

His purpose, it is clear, was to carry to success the intention of the great pioneers of science, by showing how an independent and comprehensive study of nature does in fact reveal the moral foundation of being, which Greek society was apt to call "justice." The Milesian cosmology had failed in this purpose, because it developed into the mechanistic science of the atomists, and supported the skeptical relativism of the sophists. Two errors, Socrates believed, were responsible for this failure. The first was an exaggerated interest in celestial nature, to the neglect of human affairs. The second was the failure, in part corrected by Parmenides, to realize the pre-suppositions or first principles of scientific study. It was this second error, Socrates saw, that led to relativism and skepticism. To correct these errors, it was necessary to discover the method

as all geometrical figures only specify what we call "geometrical form." Geometrical theory, although it consists of definitions of specific forms, is tied up by these definitions into a unitary knowledge, which in its totality defines geometrical form; and the development of geometry presupposes an initial insight, which all geometrical science only makes explicit, into geometrical form as such. What, therefore, is the basic insight and the constitutive form of our knowledge of man?

It is, Socrates concluded, the insight and the form which are justice, though perhaps it matters little what we call it. All the virtues—piety, modesty, courage, prudence, shrewdness, poise, etc.—arise from an understanding of the objective pattern of permanent and healthy human relationships within which we necessarily live. There are laws of human behavior, not in the modern sense which would explain every human act, however abnormal, as the instance of some law, but in the Greek sense which recognized certain permanent facts to respect which is to succeed and to violate which is to fail in all our doing. The basic virtue, consequently, is an insight into this universal norm of human behavior and social structure. There is a moral pattern which is proper to human life itself, and which can be departed from only with disaster to oneself and society. It is only in appearance that we can "get away with" violations of this moral law. Since the violation is of our own nature, as well as of social morality, it inevitably exacts its penalty. The sole wisdom is an understanding of this justice, the sole good is the doing of it. And really to know justice is automatically to do it, because we necessarily seek our own well-being. All wrongdoing is just confusion of mind or ignorance.

This teaching is so simple that it is easy to overlook its profundity. To impart it, Socrates had to pursue and pin down with endless patience the ambiguities and evasions which arise in human discourse. To discover it, he had to plunge deeper into the mechanism of human thought than anyone before

descriptive science—we have no other science. In man, Socrates concluded, this universal norm becomes the norm of human behavior, a moral habit incorporated into good custom and true law.

Socrates paid for this teaching with his life. Born ten years after the final defeat of Persia, he saw Athens rise to power, rebuild itself in incomparable beauty, and make itself the brilliant but hectic metropolis of that world. He loved Athens as he loved nothing else under God, not for its glory but for its stout courage and humaneness. He belonged to a group who were critical of the new imperialistic Athens; who believed that Pericles, compelled to depend increasingly upon chauvinistic and radical support for his liberal leadership, was leading Athens astray; who wished somehow to preserve the sober, homespun Athens of the past, even in building the new. Then Socrates and his friends saw these fears realized in the debacle and horror of the long war, and in the disruption of Athens between its "democratic" and "aristocratic" factions. When the reactionary faction revolted and seized power, Socrates incurred its anger by refusing to participate in its purge of innocent opponents. When the more democratic faction regained power, Socrates incurred its anger too by refusing, as officer for the day, to let the aristocratic generals who had lost a battle be made scapegoats for administrative inefficiency. So Socrates himself became the scapegoat. The most truly pious of men was charged with impiety or blasphemy, the man who had devoted his life to restore in Athenian youth the old faith was charged with perverting youth. In vain the fathers and brothers of these youths spoke for Socrates. In a packed court and in one day he was indicted, tried, and condemned to death.

Plato has given us an account of that trial. He did this in the *Apology*, in which surely only a scholarship become hypercritical can see anything but verbatim report. Socrates, writes Plato, undertook his own defense, because his inner voice had

His intention was successful, but not in the way he hoped. When justice errs, the accused becomes judge and the court is the accused. The Greek people, learning that the most just of men had been destroyed in the name of justice, renounced their allegiance to the state and its law, and looked to another law, not mediated by man, for their salvation. They put law into the skies, and made God their judge. It is we later peoples who, after twenty centuries, reap the fruits of Socrates' martyrdom, by honoring again a human law that can, if man will, dispense the awful yet merciful justice that is God.

We should spend more thought today upon the life, work, and death of this man; for time has brought our larger civilization through half its circle, to that selfsame place where stood in antique civilization the upright figure of Socrates. Our political, practical, and theoretical problems are almost identically those which he and Greece encountered. We too have established a great society upon a political constitution. We have not yet, as did the Greeks, read that constitution into the larger universe, to find in that universe, by scientific study, a larger law. We have proceeded rather in the other direction. Having received from the Greeks their science, with its high vision of a universal and natural justice, we established our political constitution upon that faith, in the doctrine of inalienable rights invested in the individual "by the laws of Nature and of Nature's God." But popular science has repeated in the modern period, only more slowly and relentlessly, the downward curve which it described in earlier antiquity. It has translated the natural law which is the divine justice of the world into a formula which is but the summary of what things do and are, a law which is obeyed in death as in life, in disease as in health, in crime as in community, in madness as in sanity. Once again, as in the later fifth century B.C., the foundations of the world are convulsed, and sophists thrive upon moral and intellectual confusion. Truth, we are told, is just someone's opinion, the perspective upon fact of some economic or other

3. Gomperz, Th., *Greek Thinkers*, trans. G. G. Berry. London, J. Murray, 1914.
4. Zeller, Ed., *Outlines of the History of Greek Philosophy*. New York, Henry Holt and Company, 1931, Part II, Chaps. I and II.
5. Taylor, A. E., *Socrates*. New York, Thomas Nelson and Sons, 1939.

word into the mouth of Socrates. Those who have assumed that Plato wished merely to exploit the fame of Socrates in order to advance his own doctrines forget that this fame was still infamy when the earlier dialogues of Plato were written; and one wonders a little at certain scholars who imply that the work of the greatest intellect of antiquity was built upon a literary deceit.

Although Plato was given to writing, he shared with Socrates a distrust of the written word. "*One statement*," he wrote when he was already old, "*I can make in regard to all who have written or may write with a claim to knowledge of the subjects to which I devote myself. . . . Such writers can, in my opinion, have no real acquaintance with the subject. I certainly have composed no work in regard to it, nor shall I ever do so; for there is no way of putting it into words like other studies. Acquaintance with it must come rather after a long period of attendance or instruction in the subject itself and of close companionship, when suddenly, like a blaze kindled by a leaping spark, it is generated in the soul and becomes self-sustaining.*" Without pretending to knowledge of this esoteric teaching, we can learn the steps by which it was approached, since Plato tells us of these himself in his many dialogues.

The most important of Plato's writings for our knowledge of the man and his thought is the book-length dialogue *The Republic*, in which he discourses of justice and presents his picture of the good and healthy state; and the first importance of this work is its frank association of philosophical speculation with a practical political purpose. The primary purpose of Plato, and of the Academy which he founded, was political education; nor did Plato ever conceive of a science not inspired and controlled by a political ideal. It is one and the same faith, he knew, which promotes the pursuit of justice and the pursuit of truth; and the *Republic* of Plato, perpetuating this faith which had created Greek science and for which Socrates had lived and died, has molded all subsequent history, by in-

fied in some way with the state and its institutions. They seek fame, honor, recognition; and their courage and dutifulness express this civic loyalty and ambition. This class Plato would house in a closed community, with no private property and without separate families. It would undergo a rigorous physical training and be liberally educated in the culture and ideals of its people. Its annual matings, scientifically managed to produce an optimum progeny, would be ritualized so as to become a civic and religious sacrament; and the children from these unions would be fostered as wards of the state. Plato, astonishingly in that day, was a convinced feminist who would open every office to both sexes. The third class of citizens, so small as to constitute a council, would be obtained by selecting the best of the second class, and subjecting them to further scientific training and to trials in practical administrative work. This council, self-perpetuated, would shape administrative policies and be the absolute rulers of the state. Plato would have the state remain small, not exceeding a few thousand citizens. He would keep it poor, in order not to incite envy, and warlike, in order to discourage aggressors.

In this ideal and secure state, Plato says, we can at last discover the seat of justice. Justice is the form or unitary pattern of this ideal society, in its proper balance of the three classes, a balance which secures the smooth fulfilment of the functions upon which society depends for its existence and health. Where the middle group is too strong, the state becomes a Sparta wholly geared for war. Where the bourgeoisie is too powerful, one gets an Athens or Corinth intent only upon economic ends and neglectful of the political needs of the state. But the well-balanced society will be a secure and truly prosperous polity.

The democrat of today can scarcely take seriously this Platonic utopia, which would permanently locate the common responsibility of government in a self-perpetuating privileged class. To sympathize in any way with Plato's conception we

whether it be the life of French peasants, of Middletown, of Washington or London "society," or of a Czarist nobility that has lost its honor.

The next wider environment, which differs from the narrower more importantly in its structure than in its size, is that of politically organized society. Many men and women are of that soldierly and administrative type which spontaneously identifies itself with some large institution and is happy only in its service. These people are loyal, reliable, dutiful, but essentially stereotyped and unstatesmanlike, so that a people ruled by its bureaucrats is never well governed. They are reactionary because their whole response is to the actuality of the state or church or other visible institution. They serve the law in its letter, they revere the state in its *de facto* governors. They are the sticklers for privilege, for custom, for a morality that is uncritical of itself.

But finally there are those who respond to a widest environment, wider than society, embracing all humanity and whatever is more than that. This response to the largest environment is expressed in creative art, science, and religion—not, be it emphasized, in the stereotyped art, science, or religion which reveres the established forms of these interests more than the reality which they seek to embrace. All three interests are really a worship of truth, or of That Nameless which to know is truth—this is why Plato said that the knowledge he was concerned with could not be put in a book. These creative people are apt to be rather oblivious of political, economic, and domestic affairs; but it is their creative power alone, brought into our political economy, which lets us see society in its larger international context, so that we can observe its controlling conditions and its health or disease, and in the light of this dispassionate and disinterested vision steer it aright. Part of this vision, of course, is the perception of the structure of society itself, in its constituent elements of which Plato tries to tell us; but really to understand, to hold fast, and to

which we should aspire, the standard by which we must appraise existing conditions, and the guide to whatever justice we can achieve. We cannot aspire, appraise, or strive without a clear and intelligible ideal.

This idealism is the key to Plato's general philosophy. Look again at the psychology of the *Republic*! The bourgeois citizen enjoys a good life only if the conditions of domestic and industrial economy are secured by stable government and just law. The soldier-administrator can pursue his ambition and have an object for his loyalty only in a firmly established and wisely governed state. The wise governor owes his wisdom to an intelligence of that universal law which his science discovers and his statesmanship applies. Universal law makes science possible, science makes the statesman possible, the statesman makes the state possible, the state and its order make industry and the family possible. The individual can function properly and hope to secure health and happiness only in an ordered community and an ordered world. In an unjust community the just man must choose, as Socrates had to choose, between doing injustice and suffering disgrace and death. The good life is not merely an individual matter. It presupposes a good society and a good world. The nearer and the remoter environments both condition individual existence; and life can be lived intelligently only if the environment can be understood and its conditions met. Knowledge and a knowable world are presupposed by even the most individual human effort. Justice and law must rule the world—yet not rule it absolutely, because the individual must still be free to deal justly or unjustly, to act intelligently or blindly. The law of nature must be a persuasive law, a norm which conditions prosperity and which ultimately conditions existence, but which does not immediately compel.

This is Plato's idealism. The law of nature, it says, is not just the summary of what goes on in nature. The law of nature is the law of health, of life, and of existence. (Much of

vast economy which is the cosmos. In the physical realm, certain constancies of setting and rhythm provide the conditions of organic life; and animal and vegetable life reciprocally condition each other. Each natural species, indeed, is conditioned by many and perhaps by all other species, so that each species has its place, supporting and supported, within the universal economy. All existence is a commerce or symbiosis. Simply by remaining true to its type and by perpetuating its type, each individual thing subscribes to the cosmic order. Fidelity to type is obedience to cosmic law.

Man's true law is his fidelity to man, *i.e.* to his human character. Man is distinguished from the higher animals by his social nature—society is a form and condition of humane living. But man is even more basically differentiated from all other species by his intellectual faculties, arising from his sensitiveness to the largest environment about him, which is what makes human society possible. It is his scientific intellect that makes him moral; for it is through intellect alone that he perceives the universal plan, and learns that his integrity to human nature is his whole and sufficient health. To do evil is quite literally to die, since it is to become what one is not. And Socrates was therefore right when he equated righteousness with understanding and identified vice with ignorance.

In the cosmos, the law appears as the great conservator, perpetuating the species of physical and organic nature and holding them within their appropriate bounds and to their mutual service. But in the individual, the law appears as a creative force, since it is through the individual alone that the cosmic pattern is continually regenerated in existent nature. Plato's most compelling paragraphs are his descriptions of the creative working of the law in ourselves. Even in its healthy appetite for good food, he might have said, the body seeks its re-creative sustenance. In the passion of sex, he does say, it seeks its reproduction in the beautiful mate, with unconscious forethought for sound and healthy progeny. When ap-

having its source in the local and transient things which are the constituents of nature. At some risk we may call this conception a dualism of *Form and matter*—this name at least is preferable to "The Theory of Ideas." In the *Timaeus*, an important dialogue in which Plato is careful not to make use of Socrates, but advances his teaching merely as an hypothesis incapable of strict demonstration, a dualism of this sort is presented. The topic discussed is the creation of the world. The creative process of nature may be understood, we are told, as the working of a great *demiurge*, a creative god immanent to the world. This divine artisan has at his disposal a material stuff, which is described somewhat atomistically. In incessant and chaotic motion, and divided into small and inert particles, matter is ruled by mechanical necessity and is devoid of all large and intelligible design. Matter is in itself neither good nor bad, it is aesthetically and morally characterless or neutral. Matter is the "formless" not because it has no character whatsoever, but because its character is so local, shifting, and infinitely diversified that it cannot be steadily contemplated nor intelligibly defined. The creative demiurge has, however, a model accessible to his intelligent vision. This model is a transcendent Form, wholly beautiful, constant, and supremely intelligible. Gazing upon this Form, he shapes mechanical matter, *so far as necessity allows*, into a material replica of the Form. What results is the existent cosmos, compounded of Form and matter, of stability and motion, of sameness and difference, of universal intelligible character and particular visible character, of beauty and defect, of success and failure, of goodness and decay, of truth and error. This divinity immanent to the world, Plato makes clear in other writings, indwells all things. It works in each thing as the response of that thing to the cosmic Form, and as a striving of that thing to be its true self, in fidelity to its type. In man, this response and this effort are enlarged to become a creative adoration of the cosmic Form. Man's fidelity to type is his fidelity to his reason, which is his cognition of

which number itself devolves. But in accepting this Eleatic insight, Plato did not renounce the Milesian science, which Heraclitus had shown to presuppose the radical and irreducible reality of change and motion. He accepted something also from the atomists, who had made clear the effectiveness of even the smallest and most particular constituents of nature in the determination first of their own destinies, and through these of the larger courses of nature. All of these apparently contradictory insights Plato recovered, reconciled, and conserved for posterity in that stupendous, simple, and in some respects irrefutable doctrine of Form and matter. At one stroke, leaning upon Socrates, Plato established again a theoretical science that was about to dissipate into paradox, sophistry, and skepticism. At one blow, Plato restored faith in the human intellect and its power to know truth, and propelled science up all the centuries to ourselves and the ages to come. And in restoring to man his intellectual faith, Plato restored to him also his moral faith, by showing that the world known to the intellect is a world compact of beauty and goodness, and contracted indissolubly with justice. After six centuries of modern criticism, criticism which in certain of its conclusions is altogether cogent, Plato looms larger today in human history than ever before; for criticism, finally, can only enlarge, not minimize, that Platonic truth. More than Plato man may hope to be; but to be less than Plato is degenerate. Such is the irreversibility of creative thought.

It was necessary, of course, not only to devise this great conception compounding existent nature out of Form and matter, but to demonstrate its truth. The arguments used to do this were of two kinds. One of them applied the Socratic irony; it pretended to accept the skeptical or sophistical conceptions of those who denied truth or justice, and proceeded to show how even these conceptions illicitly assumed what they denied. Thus in the opening books of the *Republic* the sophist who insists that justice is only the legitimization by

introduce them to mathematical science, *i.e.* to natural science.

Mathematics is not, however, the end for Plato of our intellectual study. Just as we can break down the visible patterns of things into a few elementary geometrical figures, and then reduce our definitions of these to a number of axioms, so we can proceed upwards from this set of mathematical axioms to a still smaller number of metaphysical principles; and ultimately, Plato believed, one reaches an insight into that ineffable Being out of which all articulate and definable form proceeds. Into this *dialectic*, which was the culmination of Plato's teaching, and which carries the thinker to a religious vision of the Good, we will not go, since it is that truth which Plato said could not be imparted by words. But it is evident that Plato found in mathematical science, with its rational certainty and its universal applicability, the great bastion of his moral and intellectual faith.

In both of these arguments Plato leans to the rationalism of Parmenides, who first perceived clearly the theoretical form of science, and showed that it presupposes a unity of character in nature which is the object of science. But Plato combines the Eleatic insight with the insight of Heraclitus, and refuses to deny reality to motion, change, and diversity. These three thinkers, Heraclitus, Parmenides, and Plato, showed the limits within which all theoretical speculation about nature and man must move. Change and constancy, individual and universal character, motion and immobility must all be allowed reality.

The Platonic metaphysics implies a Platonic theory of knowledge, or *epistemology*. Plato's epistemology is a modified rationalism, not the stark rationalism of Parmenides. Reason, he taught, is the faculty which discloses to us, within the transient actualities apprehended by the senses, the true forms of things. Between ordinary sensation and scientific intuition there are intermediate stages in common sense, ordinary understanding, and artistic vision. Plato did not despise the senses. He made them a condition of all natural knowledge, providing

instances of general laws or specific processes, since this is the only way we can initially understand them. But why do individuals so conform? What is our explanation of this deference of particular events to universal norms or general forms?

Again and again in his writings Plato takes up this problem, only to let it fall again unsolved. There is no solution, he concludes, to this mystery upon which all theoretical knowledge and all intelligent conduct is established. Nor, we know after two thousand years of meditation upon this problem, is any solution possible so long as we identify knowledge, as did Plato, with a purely theoretical science or a purely theoretical philosophy. We can say with Plato that things "participate" somehow in general forms; but how they do so, whether the general form molds the individual thing or the individual thing pursues the general form, we cannot say. Only ask this question and inquiry is balked, reason is stopped in its tracks.

But this core of opaque unintelligibility at the very heart of the Platonic system has serious consequences. We do not get natural science simply out of mathematical axioms and their applications. To apply mathematics we must have prepared the way for it by an initial analysis of observable fact, in which we distinguish by means of qualitative differences certain *types* of things or processes. How can we be sure that the types we distinguish are the real forms, the authentic "species" of physical or organic nature? The Platonic rationalism presupposes, we see, a kind of foreknowledge of the "real" constitution of nature, prior to all experience of the individual constituents of nature and their behavior. This implication Plato duly recognized in his doctrine of reminiscence. Somehow, he suggested, we must bring with us, perhaps from an earlier existence, our infallible insight into the true forms of nature. Science is not a discovery, but only a rediscovery in particular situations of a cosmic structure the knowledge of which is given to us with intelligence itself.

Thus Plato did not avoid, in the last resort, certain errors

tional mechanism of society, and which appears as a balance or proportion sustained amongst the parts of society. It is within this constitutional form that must proceed all of the life of society, if society is to remain healthy and not decay nor rupture. Further, this constitutional form appears on a larger scale as the constitution of the cosmos itself, in a functional mechanism which preserves the cosmic economy by stabilizing, "in the fixed order of time," the species of nature and their reciprocal dependence. This cosmic constitution is revealed to the human reason as a knowledge of universal Form, which allows man to pursue a theoretical science, discovering and defining that Form in its specific manifestations and its causal sequences. Finally, we found a crucial inadequacy in Plato's thought, the consequence of which is an inescapable dogmatism. Plato's error, we shall discover at the close of our review of modern philosophy, was to fail to distinguish the forms of society and science with sufficient rigor from the content which is conditioned by those forms. He did not distinguish the political constitution from the changing body of custom and law; and he did not distinguish theoretical form from the changing content of specific hypothesis. He did not discover, in short, a cosmic law which lies beyond the specific processes of nature. But this is to anticipate.

There was another Plato, whose aesthetic and religious insight always impelled, yet could never completely contain itself within, the scientific studies of this supreme Greek intellect. This other Plato occasionally took the pen from the scientist's fingers, and adjoined to the rigorous conceptual analysis a parable or myth, using artistic or religious symbolism to suggest a vision that intellect could approach but not communicate. The myths of Plato may have preserved some of the imaginative conceptions used in the Pythagorean cult or in the mystery-religions. They treat of the immortality of the individual soul, of the day of judgment in which each individual

tant for its influence on medieval thought, and for its conception of the relation of eternal form to moving existence.

The *Republic*, whether we attribute its teaching to Socrates or to Plato, remains the supreme Greek classic and the best introduction to Plato himself. The *Epistles*, especially the seventh, shed light on Plato's political activity.

1. *The Dialogues of Plato*, trans. B. Jowett. New York, Random House, Inc., 1937.
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3. Taylor, A. E., *Plato*. New York, Dial Press, Inc., 1936.
4. Ritter, C. *The Essence of Plato's Philosophy*, trans. A. Alles. New York, Dial Press, Inc., 1933.
5. Gomperz, Th., *Greek Thinkers*, trans. G. G. Berry. London, J. Murray, 1912, Vols. II, III.
6. Zeller, Ed., *Outlines of the History of Greek Philosophy*, trans. L. R. Palmer, New York, Henry Holt and Company, 1931, Part II, Chap. III.
7. Woodbridge, F. J. E., *The Son of Apollo*. Boston, Houghton, Mifflin Company, 1929.
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different conception of nature; and with Plato Aristotelianized, and Aristotle Platonized, it becomes well-nigh impossible to demarcate clearly the two thinkers.

Aristotle entered Plato's Academy at the age of eighteen. He came from Macedon, the rising monarchy to the north, where his father was court physician; and he resided at the Academy no less than twenty years. It is astonishing, therefore, to find in Aristotle's many allusions to Plato only what might have been derived from Plato's published writings, as we know them today, and little reference to that intimate esoteric teaching which Plato held to be incommunicable in books. Aristotle does record, it is true, a public lecture given by Plato on the subject of the Good; but he tells us only that Plato became very mathematical, mystifying his audience. Aristotle's statements about Plato are those of a hostile, unsympathetic, and not too well-informed critic. The twenty years he spent at the Academy covered the last years of Plato's long life, when the aged thinker may well have retired from active teaching, and been immersed in public affairs.

We should emphasize perhaps the early training of these two men, which inspired totally different interests and approaches to science. Plato was by birth a free and aristocratic Greek citizen, whose life and thought were dominated by his political purpose, which was the redemption of the city-state, and whose scientific training was in the mathematical tradition of Socrates, the Eleatics, and the Pythagoreans. Aristotle was a Macedonian subject who spent most of his life as an alien resident of Greek cities, whose admiration of the city-state was that of a disinterested outsider and beneficiary, and whose earliest scientific training was biological, with probably some knowledge of atomistic and Milesian theory. Aristotle, moreover, came to Athens when that city had definitely failed in its struggle for power, and when the city-states were overshadowed by the rising monarchy to the north. Libertarian

could be converted by a simple modification into a nonmathematical system adapted to his own interest and method.

What we do mean by a *development*? A development is a temporal change having a beginning and an end. It is a unit of process, a real unit of change. Secondly, it is a recognizable and describable process, one that recurs again and again at different times and places. And thirdly, it is a cumulative or directed process, one which points throughout its course to a certain definable goal or terminus. In organic nature developments are everywhere evident and often striking. Every living creature proceeds through such a development from its inception to its maturity. Those organisms which pass through one and the same type of development we classify as a *species*. Thus the diverse species of organic nature indicate the different sorts of organic development known to us. Today we do not usually speak of species when studying physical, geological, or astronomical fact, because we conceive physical nature to be inorganic. But Aristotle wished to establish his whole science upon organic concepts such as development, species, etc.; and he accordingly applied the concepts in every field, to physical as well as to organic phenomena.

It is by comparing individual animals and plants, in their visible anatomies and developmental processes, that we classify them into species. We may then compare these species, placing those which are most like each other in groups which we call *genera* (plural of *genus*). We can then compare genera, to reach higher "orders," "families," "kingdoms." The animal and vegetable "kingdoms" have been very exhaustively classified in this way. The complete classification has the appearance of a genealogical tree, which Darwin showed it literally to be, because the observable similarities among animals and plants, especially their similarities of development, are clues to their evolutionary origins. But imagine this specific and generic classification extended over all of nature, to cover also inorganic nature! Each organic and inorganic thing will now be under-

never overlook specific differences. It is a fact that the science of living organisms cannot ignore the specific forms of nature.

But we know today that this study of the specific forms of organic nature leads us onward to the concept of evolution, and to an evolutionary science discovering the origins and mutations of the species of life. Return for a moment to the concept of development, which is the generative idea in Aristotle's science, and try to universalize this concept! A development is a directed succession of stages $a\ b\ c\ d$, d being regarded as the definitive stage towards which a , b , and c are directed. To universalize this concept, you must conceive of the universe in its entirety, and in its whole history, as a vast directed advance $A\ B\ C\ D$. You must conceive, that is to say, of a single vast universal evolution, advanced by every occurrence that is or was or will be. Such a conception is impossible, you may say, since every evolution requires a context or environment conditioning it and causally explaining it. The universe as an entirety cannot evolve, since by definition it has no external context which might condition its evolution. It may be argued that universal evolution *is* conceivable; but this is irrelevant to our topic, which is the science of Aristotle. Aristotle did not only reject the notion of a universal evolution, he rejected the hypothesis of an evolution even of species. He allows, that is to say, only individuals to develop; and he allows them to develop only within the limits of their specific forms. Any individual aberration from the normal line of development, or from the fixed form and behavior characteristic of the species, is for him an accident devoid of scientific significance, and defying explanation. Aristotle's controlling conception is that of a world composed of a large number of eternal and immutable species, made up of successive individuals which can only be understood as instances or specimens of these species; and so to understand things, allocating them to species and defining these species, he took to be the sum of science.

senses then again discovered in particular instances. But Aristotle can insist that the specific forms of nature are apparent to the eye, even as they inform individual things. We actually see dog or cat, and immediately recognize the individual as a member of its species, although reasoning may be required to reach a satisfactory definition of the species. In this doctrine Aristotle is more empirical than Plato, in that he enlarges the role of sense-observation in science. Aristotle also believed, however, that the problem of the relation of form to matter disappeared in his mode of explanation. He held that the specific form appears in the development of the individual thing; and this would mean that specific forms are already resident in the matter which is informed by them. Aristotle, we earlier mentioned, believed his concept of substance, by which he meant this union of form and matter in existent things, to be his greatest contribution to science; and we must examine this teaching more closely.

The specific forms of nature, he says, although they are immutable and eternal, do not exist apart from the things they inform. They are not transcendent, like the Form of Plato, but have their whole being within the existent and material world. Form exists only in some material realization; and matter exists only in some specifically organized form. This would mean that the process of development is really the development of matter into some specific form; and this would seem to require the assumption of as many sorts of matter as there are specific forms or species. Aristotle is moving towards a materialistic philosophy in which form would be only the complete manifestation of matter. He accepts this implication when he says that matter is *potential* of form, form being the realization of these potentialities, or potencies, of matter. Yet he never relinquishes the Platonic view, which gave to form a being in its own right, and which saw in matter only the material which is shaped by form. He swings between, or overlaps, the opposed views of "formism" and materialism. Thus his science

(i.e. not formal), at least two particular causes being required to bring about a particular change. Thus it is stated that a body will change its velocity only if some other body exerts a force upon it. Aristotle's doctrine, it was finally perceived, really precludes and defeats causal analysis. A "specific form" is initially just the similarity between individuals "of the same species"; and we cannot suppose that the similarity of a thing with other things is what determines its behavior. A pup does not develop into a dog because there are other pups, similarly developing into dogs. If this were the case, the death of all other pups would require the death of this pup. However, it remains true that we *discover* the particular causes of natural occurrence by taking note of such similarities. If we want to know the particular causes of a particular pup's death, we look around for other instances of animal mortality, similar to and illuminative of this instance. This suggests that there is some mysterious connection between the two large facts of similarity and causation in nature. We may not discuss the nature of this connection here, since our purpose is only to show how Aristotle confused the concept of causation.

These very general doctrines concerning substance, potentiality, development, causation, and the relation of form to matter are presented by Aristotle in an introductory work which he entitled "first philosophy." We will understand the doctrines better by noting Aristotle's application of them in special fields; but before we turn to these special applications we should take note of Aristotle's *logic*, which in its prescription of the method to be used in all scientific research constituted a most general application of his metaphysical teaching or "first philosophy." Aristotle has often been called "the founder of logic," presumably because his logical treatises were long regarded as the definitive manual of this study, which they remained until the close of the nineteenth century. The Eleatics who followed Parmenides have probably more title to the fame of having originated logic; but Aristotle

second syllogism may be symbolized: All S is M , no P is M , so no S is P . Aristotle regarded the first type of syllogism, that of the form: All S is M , all M is P , so all S is P , as the correct scientific form of argument or exposition, to which all the other forms are auxiliary. The only reason for preferring this type would seem to be its conformity with the doctrine of definition. If the members of a group S belong to a certain species M , and the species M belongs to the genus P , then the conclusion of the syllogism will state that the group S belongs to the genus P . The letters S and P are chosen to indicate respectively the Subject and the Predicate of the conclusion; and M indicates the Middle term, which by appearing twice, once in each premise, relates the premises to each other. Aristotelian logic is essentially an exhaustive survey of the syllogisms which arise when we abide by certain formal requirements, limiting us to sentences of the forms: All S is M , no S is M , some S is M , some S is not M . These syllogisms can then be classed as valid or invalid, according as the conclusion is or is not required by the premises.

The third doctrine is that of the *categories*. Aristotle held that all sentences can be classified into eight or perhaps ten sorts of sentence, according as to whether they predicate of some subject its substance, its quantity, its quality, its position in space or time, its action, its exposure to action, etc. The categories would seem to indicate the ways in which the verb *to be* was used in the Greek language (this *is* a cat, here *are* fourteen, this *is* black, it *is* on the table, etc.). The doctrines of definition and of the syllogism support one another; but the doctrine of the categories seems to be independent, and to presuppose a different conception of nature and scientific method.

The Aristotelian logic remained authoritative until a generation ago, and it still has its adherents. Most contemporary logicians regard it as a very limited, wooden, and artificial exposition of the formal properties of language. It is not true,

illustrate his basic concept of organic development. He distinguished some organic functions as vegetative, others as animal because they involve locomotion and sensation. In man, he tells us, the vegetative functions support the locomotive and sensitive animal functions, which in turn support the intellectual functions distinguishing man from his fellow creatures. Aristotle thinks of the development of the vegetative, animal, and intellectual functions as resulting from three distinct potencies. The matter which enters into living organisms, he says, is of a special sort, being composed of the four material elements (earth, air, water, fire) together with a portion of a special sort of matter, the quintessence, which otherwise appears only in celestial bodies. Thus Aristotle explicitly postulates at least three sorts of matter. There is the ordinary terrestrial matter which we should call inorganic; there is the celestial quintessence; and then there is organic matter, blended of these two.

Aristotle's biology is basic to his psychological, ethical, and political studies. We remember Plato's psychology, which distinguished in human individuals three sorts of response to three successively larger environments: The response to the immediate environment stimulates the productive and procreative functions, the response to the state stimulates the social and political functions, and the response to the universe stimulates those scientific and religious interests which are the prerequisite, Plato believed, of true statesmanship. Aristotle seems initially to accept this psychology. In his biology he defined man as "the animal endowed with reason," *i.e.* the species which adds to the vegetative and animal faculties that of reasoning; and when he comes to discuss man further, he defines him as "the political animal," which would imply that he, like Plato, saw in man's political activity his distinctive character. Further, Aristotle presents ethics, the inquiry into what is right and wrong in human behavior, as only a part of the larger study of man which is political theory. We are accordingly surprised

after scientific truth. Science, like art, has been as creative in the garter or tenement as in the manor or mansion. Aristotle's ethics are undeniably egoistic. They teach that the first duty of a man is the fullest realization of his individual powers; and they do not say that such realization involves the fullest responsibility of the human individual for his fellows. Human affection, in Aristotle's teaching, is limited to family affection and personal friendship. About friendship Aristotle writes enthusiastically and convincingly.

After this ethical introduction we are not surprised to find in Aristotle's political treatises a certain obliviousness to the moral foundations of government, which lie in the assumption by the individual of moral responsibility to and for his fellows. The *Politics* of Aristotle initiates an exhaustive study and an impartial estimate of the diverse sorts of governments that are to be found in the world. Aristotle collected "constitutions" much as he collected specimens of botanical and geological species; but his classification of types of government is less successful than his classification of species, being confused by what the logician calls a "cross-division." On the one hand he distinguishes states according to whether they are ruled by one individual (monarchy), by a few (aristocracy), or by many (democracy). On the other hand he distinguishes between states as good or bad. He accordingly finds both good and bad versions of all three types of state, the bad versions being respectively tyranny, oligarchy, and demagoguery or mob-rule. A Platonic note enters when Aristotle finds good states to be those which are subject to constitutional limitations, whatever their forms; but he does not show why constitutionality is good. He says that the best state is the good and constitutional monarchy, and that tyranny, which is unconstitutional autocracy, is the worst state. Democracy is not so good as monarchy, but demagoguery is not so bad as tyranny. Still another leading idea in Aristotle's analysis conceives the best form of the state to be that most appropriate to prevailing conditions; and in

We have not yet considered Aristotle's physical science, where the limitations of his method are most apparent. Modern science has not recognized species in physical nature; and Aristotle's insistence upon finding them there takes him to strange conclusions. He fell back upon the popular view, rejected at least in principle by the earlier scientists, that the character of celestial nature is altogether different and more perfect than that of earthly nature. This allowed him to postulate new and different principles in his explanation of celestial processes. For example, he calls upon a very special sort of matter, the quintessence, which is described as being peculiarly amenable to form, in order to explain the remarkable regularity of the movements of sun and stars; and he supposes that in the celestial realm species are normally constituted of but one individual member. This is really to confess the inapplicability of the Aristotelian science to astronomical phenomena. Finally, the process of development becomes, in all of its physical realizations, only a movement of things in space, to or from their "proper" places in the cosmos. All motion is said to derive ultimately from the original circular motion which we perceive in the "sphere" of fixed stars. This motion is caused by God, who by his transcendent yet immobile Being outside of the sphere stimulates its rotation. Circular motion is said to be most perfect because it is most like immobility, and does not involve linear displacement. This perfect motion is transferred with increasing irregularity and imperfection to interior spheres, the innermost of which is that of the moon's orbit. Aristotle thinks of the heavenly bodies as the visible conjunctions of these otherwise invisible "crystalline spheres." More than one sphere was usually required to explain the motion of a heavenly body. All in all, fifty-five spheres were called upon to explain the lunar, solar, planetary, and sidereal motions; and Aristotle spoke of the spheres as divinities, so that they constituted a pantheon of fifty-five gods.

Below the moon the circular celestial motion is broken up

Further, not only must there be as many sorts of matter as there are forms, but there must also be, one would conclude, a most basic or rudimentary matter out of which develop the most general forms. Nor does Aristotle escape the transcendentalism for which he so emphatically indicts Plato. Not only are his eternal specific forms really transcendent, inasmuch as one and the same specific form stimulates the development of a given species not only here and now, but always and everywhere throughout space and eternity; but all the motion of nature is finally attributed by Aristotle to the stimulating and effective presence of a God who is outside of the universe and no part of it. One might continue this indictment for many pages. One might show how Aristotle's science, steadily displacing better science, finally resulted in intellectual stagnation and a scientific coma which lasted until the pioneers of modern science returned to Plato for their method and inspiration, and so overcame the sterilities of Aristotelian thought. One might also point to the long struggle of modern scientists against an ever resurgent vitalism, vitalism being nothing else than a return to Aristotle's ascription of causal power to specific forms.

Yet after all this is said and done, we shall have to return to do justice to Aristotle, for three reasons. In the first place, there are indeed natural species, they do exist, and we cannot study nature without full recognition of them. Physical science does not really, as it may seem to do, rest its whole theory upon mathematical axioms. It, too, needs concepts of natural types, which are really species although they are not so called. It requires its electrons, its atoms, its chemical elements, its organized and specific kinds of energy. Secondly, the study of organic species has led to the discernment of an evolution of species; and the hypothesis of evolution, since it cannot be confined to organic nature on this earth, must ultimately give to all of our science a new evolutionary and organic character. And thirdly, if Aristotle introduced confusion into the mag-

but not the end and purpose of life. This apparent contradiction too we must resolve.

Notes for Further Reading

The best and most scholarly rendering of Aristotle's works in English is the Oxford Translation, recently completed. The *Metaphysica* (Vol. VIII) and the logical treatises (Vol. I) present his basic philosophy. Volume IX comprises his ethical, Volume X his political treatises. The *De Anima* (in Vol. III) is epistemologically important. The *De Poetica*, aesthetic criticism dealing with tragedy, will be found in Volume XI.

There are earlier translations of many of the works. The student might do better to read first some studies of Aristotle by modern scholars.

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This nomenclature is misleading, not to say erroneous, in that the earlier period was often more rigorous and puritanical in its moral ideal. We might say, perhaps, that the later period pursued philosophy for its emotional inspiration, without scientific and moral concern for the truthful description of fact. The source of this shift of interest, in the writer's opinion, is to be found in the changed political condition of Greece. Hellenic Greece was free and self-governing; its moral and intellectual life found realistic expression in political activities, and it therefore required a realistic science. But later Greece was politically subject, first to Macedon and then to Rome; and it accordingly cultivated a "reason" which elevated the individual as the citizen of a universal and divine polity, but which encouraged him to be indifferent to the social and political actualities about him. The living cord of liberty which had tied the intellectual life of Greece to actuality had been cut; and the Greek intellect increasingly gave itself to a dream.

Nothing illustrates this movement to unrealism better than the uncritical homage brought to Socrates in those later centuries. Socrates had in all things tried to be a man, claiming no more than man might claim, dismissing the wisdom attributed to him as only his awareness of its lack; but the later centuries made of Socrates a god, attributing to him faculties beyond the range of common man. Further, Socrates had died to save the faith of the Greeks in their political institutions, *i.e.* in the civic law; but these later centuries made Socrates the martyr of the law, and the patron saint of a moral idealism that looked away from human government to a divine justice in the skies. So, for many centuries, men sought a moral salvation in no way related to government, and became indifferent or even hostile to law. What else could they do, so long as one or another imperialistic power deprived them of moral responsibility and of its exercise in self-government?

The broadest movement through which Socratic and other

But Cynicism is really a transitional attitude, marking a shift or expansion of loyalties. If it does not develop into something more than this antisocial revulsion, it degenerates into mere boorishness. So Diogenes, we read, lived in a hogshead, scorning every human amenity not directly provided by nature. That he was honest in his fashion we know from the boon he asked of Alexander, called "the Great," who would have willingly pensioned him. "Just stand," Diogenes said, "from between me and the sun." Said Alexander: "If I were not Alexander, I would be Diogenes!" A pretty tableau! The sycophantic reporters hastily jot down the great man's words, and rush off to telephone their editors!

In *Stoicism*, what was true in Cynicism was broadened and elevated into a noble metaphysics, which became perhaps the best and broadest faith of that pagan world. Stoicism gets its name from the *Stoa* or Porch, the place in Athens where Zeno, a Semitic merchant of Cyprus, first preached this faith around 300 B.C. Through the writings of Epictetus, a crippled Greek slave, through the great Roman stylists Cicero and Seneca, and through the *Meditations* of Marcus Aurelius, who was Emperor of Rome at Rome's imperial height, Stoicism came down to modern times. For some six centuries it was the chief faith of intellectual antiquity.

Stoicism translated the political faith of earlier Greece into a "moral" faith, making the individual a citizen of the universe, subject only to universal and divine law. In its metaphysics it looked back of Socrates to the earlier science, although its emphasis was Socratic. The human reason, it taught, discovers the vast economy or divine plan of the world, in which each individual thing has its proper place and function. Not a sparrow falls to earth except by divine ordination, they said. A man's whole duty is to preserve himself intact from more proximate stimuli, which mislead and destroy him, and to live wholly in the light of this rational knowledge of universal nature; for man's integrity is his reason, at once theoretical and

earlier directed Greek philosophy were no longer remembered, they persisted subconsciously; and they come strangely and importantly to light in the Stoic vocabulary. The universe, said the Stoic, is the great City of God, a realm of moral individuals ruled by divine justice. The Stoics were not transcendentalists like Plato. Their City of God did not exist only in the skies or beyond. It is the actual material universe which now and everywhere exists, but which only reason discerns. It is a City without a written code, a divine community needing neither church nor priesthood, and which no earthly catastrophe can harm. All men are by birth the citizens of this visible-invisible realm, so replete with light, beauty, law, goodness. The eternal and divine constitution of the world is wholly realized in every part of the world. The sole evil is our failure to recognize this goodness. Stoicism reacted to the political failure of antique society with a renewed confession of faith. The free cities had fallen; but the free City of God, which is the universe itself, remained undisturbed, and provided a home for man. Spinoza would later dream this dream again.

This tremendous loyalty, one might argue, excuses every defect of Stoicism—its confused metaphysic, in which nature is at once natural law and what conforms to natural law; its bankruptcy of affection, excused by moral casuistry; its facile catholicity, allegorizing every teaching into its own. Stoicism first consoled the Greek who had lost his freedom, restoring his self-respect; then it broadened Roman justice; finally it prepared the way for universalistic Christianity. It was the widest channel through which there flowed to posterity the Greek faith in a justice which is truth. Yet our appreciation of the nobility and generosity of this Stoic faith, and of its ennobling influence upon the later centuries and our consequent debt to it, should not blind us to its great defect, which was its moral unrealism. The Stoic taught that the world is even now perfect, in spite of all apparent evil. The difference between good and evil, this suggests, is subjective and illusory;

Some of their scholars took advantage of the wide and eclectic character of Stoic doctrine to develop a very empirical theory of knowledge. All knowledge, these men taught, comes from experience, the mind being initially a blank tablet upon which impressions are left by observed particular things; and memory and inference then allow the advance from these particular impressions to the general concepts of a universal science. This epistemology was revived at the beginning of the modern age to support the philosophy of *empiricism*; and it led some of the Stoics, as it was later to lead Berkeley and Hume, to skeptical conclusions. To avoid these, they vaguely appealed to "common sense," by which they meant a faculty to apprehend general forms. Here they followed Aristotle. Stoic thinkers also developed the Aristotelian logic, in particular the doctrine of the categories, and the important properties of conditional sentences of the form: If *A*, then *B*. The Stoic epistemology and logic helped the pioneers of modern thought to break away from the scholastic philosophy of the Middle Ages, and they have continued to play an important part in later philosophy.

The great virtue of Stoicism, we said, was its universalistic humanism. The earlier Greeks were humanistic in their respect for the human "essence" which dwells in every human individual; but they tended to identify humanity with the Greek people, leaving "barbarians" outside the pale. These Hellenistic Greeks made no such distinction. Semite and Greek, slave and master, commoner and emperor, halt and whole were equally citizens of "the blessed City of God," and children of the God in whom all things "live and move and have their being." This hospitable humanism, however, was facilitated and made futile by political indifference. They affirmed human equality, but they did not draw the political implications of this doctrine. They tolerated every sort of economic and political disfranchisement. Nevertheless this merely verbal equalitarianism was not without some realistic consequence. The slave was finally

Under the Empire, the city of Rome became increasingly a court of last appeal for cases not covered by provincial laws. The Roman jurists used Stoic principles in their creation of a law of equity, the *jus gentium* or "law of peoples." This Roman jurisprudence—not to be confused with the old civic law of Rome—was codified under Justinian in the sixth century A.D.; and as "Roman law," never forgotten in the Italian law schools, it deeply influenced the development throughout Europe of the concept of justice. Through Cicero and through Roman law, the Stoic concept of equalitarian and universal citizenship began its descent to earth, to become after many centuries the theory of democratic society.

A second Socratic development, existing alongside of Stoicism through these later centuries of antiquity, was *Epicureanism*. Much as Stoicism corrected and enlarged Cynicism, the Epicureans elaborated the hedonistic doctrine of *Aristippus of Cyrene*. (*Hedonism* is any doctrine which finds pleasure to be the substance or criterion of goodness.) Aristippus had come to Socrates from Protagoras, and he seems to have seen in Socrates only a more able sophist, appealing against convention and law to some purely individual and subjective insight into truth. Whereas the Cynics found this criterion in the individual's moral sense of self-integrity, Aristippus found it in the immediate conscious apprehension of value, *i.e.* in pleasure. Man's reason, Aristippus implied, is his ability to calculate, aided by memory and anticipation, the consequences of his conduct; but his criterion of what is good for him must be a deeper, personal, and natural instinct, common to man and the animals. Every creature is endowed with sensitivity to pleasure and pain, which tells it what to pursue and what to avoid; but man, by means of his reason, is able to apply this instinctive faculty widely and precisely, by weighing pleasures and pains and calculating an optimum synthesis.

Hedonism usually has received hard treatment from moralists, who are apt to find in it only a defense of license. The

observe, by comparing and contrasting the Cyrenaic and Cynic doctrines, their common error, which was their isolation of the individual from his moral context in society. This isolation left their ethics arbitrary and wilful. The Cyrenaic could equate the good with pleasure, the Cynic could equate it with aloofness from pleasure. Each of the doctrines confused reality with one or the other of the two criteria of reality, with immediate experience or with logic.

Epicurus rescued the truth which lay in the Cyrenaic hedonism by replacing the individual in his social and natural context. Born and brought up like Pythagoras in the isle of Samos off the Ionian coast, Epicurus came to the mainland of Greece for his education. Samos had earlier escaped the horrors of the long war; but on his return he found it ruined and desolate. Epicurus evidently experienced a deep revulsion against the cultured, educated, but hectic and irresponsible world which bred these wars. He hated the great world with its grandiloquent and deadly superstitions—its idols religious, political, scientific. He taught sobriety, and established his “gardens” in which humble, sane, and loving people could take refuge from the world, scorning its prizes and its feverish ambition. In these Epicurean groves all was plainness, simplicity, and friendship. Men and women lived as nature intended them to live, satisfied with normal pleasures, healthy with work, blessed with human community.

The essential doctrine of Epicurus was that of human freedom. There is no just power, he taught, which has authority over man. The human individual is properly a natural unit, a self-determined and self-controlled absolute. His whole duty is to himself, since there is no higher unit of which he is a part. His virtue is self-preservation and self-discipline; and he is wholly responsible to himself for his conduct. Virtue, therefore, even as Socrates taught, is just sane and intelligent living.

To establish this doctrine Epicurus appropriated the atomistic science, rejecting all other Greek science. His intention

obviously, of course, atomism fails to account for the existence of a life cognitive of its own conditions. The ascription of consciousness to atoms or atomic collocations would cause the collapse of the atomistic view, if this consciousness is allowed to influence their behavior. The failure of Epicurus to see the social and metaphysical implications of his individualistic creed caused the degeneration of Epicureanism. When memory of the noble life of its founder waned, there was left the cult of refined sensuality which the name "Epicurean" connotes today. But we may believe that Epicurus had truer descendants in the early Christians, whose cult of the community of friends bound by mutual love revived his central teaching.

A secondary Epicurean doctrine was to have important uses in later times. The early Epicureans withdrew from the world, but they still had to adjust themselves to politically organized society. To guide or justify their dealings with governments they developed the sophistic view, which held law to be but convention imposed upon the individual by force, into the more self-respecting and reasonable theory that government arises out of a business contract, entered into by individuals for the performance of certain specific common functions such as police duty and military protection. The intention of this contract-theory was to deprive government of all intrinsic authority, especially religious and moral authority, yet to justify government as an economic utility. Recovered in the later Middle Ages and curiously associated with biblical ideas of a covenant binding God and man, this contract-theory became an important element of modern political thought, where it supports the doctrine of government by consent and the insistence upon moral limitations upon government.

It was chiefly through the Roman poet *Lucretius* that knowledge of Epicurean doctrine came to later Europe. In his great Latin epic *De Rerum Natura* Lucretius gave to the doctrine a new and ennobling purpose. The rejection of superstition becomes a positive adoration of scientific truth, and the provin-

emphasized especially the mystical elements in the Platonic teaching. Further, Philo was influenced by the method of interpretation developed by the Stoics, who accepted many religious creeds as allegorical versions of their more theoretical faith. Thus Philo believed (as Roger Bacon much later was to believe) that Plato and Moses offered different versions of one and the same truth. The hospitable but uncritical attitude of mind supporting this belief is characteristic of these later centuries of antiquity, when men were seeking a faith which might unite into cultural homogeneity that motley Mediterranean world. The deepest cleft in the cultural landscape was the chasm between Greek and Semitic cultures, as we shall observe in our discussion of Christianity; and it was this chasm that Philo wished to bridge.

Similarly characteristic of all of these centuries is the lack of scientific interest which marked Neoplatonism. The dominating interest is moral and religious, in the unfortunate sense which divorces morality and religion from science. Philo's interest was intellectual, since he required a conceptual approach to truth; but his dominating objective was the moral and religious salvation of the individual, to which the conceptual approach must lead. He is no scientist like Plato, who required reason to "save the appearances," *i.e.* to illuminate particular and observable fact; but he used the largest framework of Platonic and Aristotelian science as a conceptual ladder, up which the inquiring mind might ascend in order, from its highest rung, to leap off into a mystical communion or mergence with absolute Being, this ecstatic vision being the sole motive and reason of the intellectual effort of man.

Argument as to whether Plato was correctly understood by Philo would be inconclusive, since the difference is essentially one of emphasis. Plato established a school of science and law, the Neoplatonists established theology. But more important than this epistemological difference was the shift in metaphysical doctrine. Plato was uncompromisingly dualistic in his dis-

with the lines: "*In the beginning was the Word [Logos], and the Word was with God, and the Word was God . . . And the Word was made flesh, and dwelt among us (and we beheld his glory, the glory as of the only begotten of the Father), full of grace and truth.*" So, of Philo and of John, elder of the church at Alexandria, was born Christian theology.

Evidently, this Neoplatonic version of Plato persisted in Alexandrian thought from the beginning of the Christian era; but it reached its full elaboration only in the third century A.D., through Plotinus and Origen, pupils both of one Ammonius Saccas of Alexandria. *Plotinus* is usually regarded as the authoritative exponent, his writings being edited and published by his pupil Porphyry in a work since called the *Enneads* from its division into nine books. The work is a beautiful fantasy, full of light and color and suggestive metaphor, warm with moral aspiration and religious anticipation. It is certainly not science, and scarcely philosophy, since its speculation is almost wholly uncritical, and weaves together with eclectic liberality half a dozen brilliant strands of earlier Greek speculation. The method is wholly deductive and nonempirical, moving from the intuition of ultimate Being downward (whereas empirical thought moves upward from observed particulars to ever more general principles); and very much as Hegel later was to weave into his speculative fantasy the concepts of contemporary science, so Plotinus finds room on his celestial ladder of form for Ionian, Pythagorean, Stoic, Aristotelian, Eleatic, and other concepts. From God, the infinite and ineffable, there moves *nous* or reason, the articulate thought of God with its plurality of forms or ideas. (It is from Neoplatonism that the word "idea" gets its present meaning. Earlier it had meant "form" or even "shape," something objective which might be known but which was not peculiarly mental in itself.) The divine ideas are eternal or timeless, they define the five categories or ways of being, and they generate a cloud of mystical numbers, of which there is one for each species, and one for

Christian creed. There were, further, numerous encyclopedias of Greek thought, and commentaries on earlier Greek thinkers, written by Neoplatonists between the third and the sixth centuries, and preserved by the church when earlier writings were lost. Thus it was that philosophy came to be identified with Neoplatonic mysticism; and although after a millennium Europe was to enjoy again a firsthand knowledge of classical Greece, it still read the Greek originals through Neoplatonic spectacles. Nor has it ever fully emancipated itself from that influence. To this day philosophy remains either shaped by the Neoplatonic tradition, or in a revulsion against it so violent that the Platonic insight is often rejected along with the Neoplatonic fantasy; and seldom, except amongst a few scholars versed in Greek, does one find any adequate knowledge and just estimate of Greek science.

The result is that in spite of our professed admiration for the Greek achievement, we have never done justice to it nor appropriated its greatest values. We look back to Greek art with its delicacy and poise, its lyrical poignancy, its sense of the audacious right word, its Homeric complacency; but we do not see clearly the Greece that gave us a realistic science and a realistic ethics, the Greece that nursed Socrates and Plato and their great predecessors. Plotinus was not Greece, even Aristotle was no true Greek. That other Greece was rugged, plain, sober; yet it too was poignant in its moral hunger, and more audacious than any Greek simile in its demand for a religion that served justice first and last. There was in the greatest Greek thinkers an incomparable honesty, a realism that has never been surpassed; and the honesty of Greece is half of the great heritage which is the source of all our blessing. Only in Plato do we know with some familiarity and completeness the superb mind and spirit, the sublime truthfulness that was early Greece.

From Greece came theoretical science, the mother of all science, and one of the two great bulwarks of the modern world. There is no reason to believe that factories and dynamos

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II THE ANTECEDENTS OF MODERN PHILOSOPHY

9 A NEW HEAVEN AND A NEW EARTH

IS THE INTELLECTUAL AND MORAL CONFUSION OF TODAY the result of our erroneous belief that we can continue to enjoy the fruits of a religious past without acknowledging their religious source? Was it religion that gave to this modern era its great impetus, generated by a millennium of great faith? It was necessary, in order to allow this faith to reach its full realization, to emancipate religion from its institutional forms, its dogmatic creeds, and its closed ecclesiastical organization. This emancipation required the disestablishment of institutions which for many had become identified with religion itself. But might it not be argued that what was emancipated and empowered by the Reformation and the Renaissance was just religious truth itself, in its essential sanity and power? Should we imagine that a purely secular culture has expressed itself in the social and scientific achievements of the last four centuries? It may be that the virtues of tolerance, kindness, justice, and mercy will not persist in individual and social life if we no longer remember their historical evolution and their religious source. It is scarcely to be denied that what there is of culture or civilization in modern society is of Christian origin; and

and their causal connections. Neither religious indifference nor religious unbelief should deter the social scientist from impartial study and objective estimate of the working of religion in human history. It is a fact that for nearly two thousand years, religious faith chiefly determined the direction of social evolution in the western world; and the effort to recover this history without full acknowledgment of its religious stimulation merely leaves the historian impotent and his narrative trivial and tedious. Religious beliefs impelled or conditioned all the moral, political, and economic history of the west. One cannot set forth the long movement of western man to his present form of society without continuous reference to Christian tenets. This does not mean, of course, that the historian should identify his own faith with that of Christianity. As a historian, he must remain free from every religious prepossession. But he does not obtain this freedom by ignoring the degree to which religious faith, for better or for worse, has molded history. His business as a historian is to state what actually occurred, and to discover what caused what. It is accordingly his duty to register and estimate the effects of religion upon political and other history, where religion had such effects. He may properly abstain from any explicit conclusion regarding the truth or error of the faith which had these effects; but he will scarcely find it possible to avoid all estimate of those effects as good, bad, or indifferent. In any case, those who read his history will draw such conclusions, since the good or evil fruits of a faith are evidence for or against its truth. A faith that destroys or weakens society cannot be true; a faith that strengthens and invigorates society may be true. Historical impartiality means honest judgment, not abstention from judgment, with respect to religion. Complete reservation of judgment is just intellectual cowardice.

By any historical measure, the rise and spread of Christianity was a social revolution of the first magnitude. The Roman empire, the greatest and stablest political organization human

destruction of Judaea was Rome's final abdication, and the passage of power from imperial to papal hands.

Roman history is an object lesson in the sources of political power, and the conditions of its retention. The Jewish people were set apart from other peoples by a rigid and fierce loyalty to their religious and national past. For more than three centuries, however, ever since the conquests of Alexander, they had been directly exposed to foreign influences, including that of the Greek mystery-religions. Among Grecianized Jews there appeared a new cult which combined the intensity of the Jewish faith, focused now upon a Messiah who would carry Judaea to victory, with the more personal ardor of the mystery-religions, which offered salvation to the individual through the mediation of a divine Savior or Christ. The new faith was Pythagorean, at once individualistic and social. It taught the redemption of a Christian community, composed of all those individuals who accepted the atonement of Christ. After a sharp struggle, this Christian faith was carried by some of its Jewish proponents to the gentile world. Because the Jewish people had established important colonies in all of the larger Mediterranean cities, the propagation of Christianity proceeded from many centers and was accordingly rapid. With the destruction of Judaea in A.D. 70 Christianity became definitely hostile to Rome, this attitude finding its earliest expression in the *Book of the Revelation* of John, later included in the Christian Bible. This writing was dedicated to the seven churches of Asia Minor, the chief center of early Christianity; and it foretells the destruction of "Babylon," meaning Rome, to make room for "a new heaven and a new earth."

Very rapidly this Christian cult spread, until it reached the remote outposts of the far-flung Roman world; and steadily it gathered into itself what was best in that world. What did it offer to its faithful, whom it exposed to contempt, ostracism, persecution, and death? Why did it gain ground in spite of the opposition of politically organized power? It is evident that

law" and to follow instead the admonitions of "the spirit." What was this "spirit," which transcended all law and all the past?

The spirit, said *Paul of Tarsus*, who first carried this radical gospel to the gentile world, is the faith, hope, and love which transforms a group of random individuals into a living community, solid and impulsive yet free. Here were three new "virtues"; and their establishment as such constituted a new theory of human nature. You must throw off your old nature, said Paul, and put on a new nature. Was this doctrine less momentous two thousand years ago than today, when it is revived in perverted forms? To appropriate the new nature, concluded Paul, you need only accept the atonement and example of Jesus Christ, the new man who is also God. Faith in the godhead of Jesus Christ is the sufficient condition of the three virtues of faith, hope, and love, which in their turn are the constitutive properties of the new man and the new society. Did Paul merely use the figure of Jesus, as Plato is sometimes held to have used the figure of Socrates, to express his own ideas and to advance his own purposes? Or shall we too say that Jesus Christ was the divine and creative seed out of which grew a new civilization? This was not the only time that such claims have been made for a human individual; but it was perhaps the only time in human history that such claims, widely allowed, have revolutionized civilization.

It is fairly well agreed among exegetical scholars that the earliest Christian conceptions, even those presented in the New Testament, are an inseparable amalgam of historical fact and imaginative interpretation. In one sense there is nothing new in the New Testament. No dictum there that has not its analogue in earlier wisdom, no incident that is not reminiscent of earlier myth, no concept that is not implicit in some earlier train of thought! The New Testament could conceivably be the imaginative creation of a gifted group of audacious seekers after religious truth. It could be a synthesis of earlier religious

The Stoics had allowed that man might live and move and have his being in God; but only Jesus, carrying to its full conclusion the Socratic teaching that piety is the love of God, dared to teach that God might live and move and have his being in individual man. Perhaps this is blasphemy still. Whatever it be, it is nevertheless the creed by which Jesus Christ brought to an end the pagan world, and announced the religious basis upon which our modern world is established; for what Jesus revealed is the truth that man is in his own nature divine, free, and creative, even as is God. How, except on this awful, audacious, and sobering assumption, should the human individual exercise moral and intellectual responsibility? Yet upon this exercise of individual responsibility we have established our society and our science. Let the modern thinker make explicit the religious and metaphysical implications of the fact of individual responsibility, which is the foundation and presupposition of modern life!

The first of the Christian virtues, accordingly, is faith in the divinity of man. Christianity was a humanism which affirmed God even in its affirmation of human rights. It saw in Jesus, whom it called "Christ," the protagonist and exemplar of this faith that man is in his incalculable measure God. It taught that we shall find God if we will look for Him in the lineaments of men and women, boys and girls. The kingdom of heaven is within man, not in the sky.

The second of the Christian virtues was its optimism, its hope. This optimism is once again our faith in creative man, relieved of the intolerable burden of past failure. Hope is our natural orientation upon the future; for to be so oriented is to recognize, intelligently and explicitly, the instinctive momentum of our flesh and blood, and to affirm, and not obstruct, our essential nature. We have forgotten, just because Christianity is still our teacher, how afflicted with nostalgia and pessimism was all antiquity. Before Christ all goodness was residue, the golden age was a remote past, the present was a

clesiastical system, which from the fifth to the fifteenth century was to be the chief agency of government in Europe, exercising powers coordinate with or superior to those of secular rulers. Since ecclesiasticism, like feudalism, has been a stage or tendency in every large social evolution, we need not suppose that there is any especially close bond between ecclesiastical form and Christian tenets. What most strikingly distinguishes Christianity from other faiths, indeed, is its explosive exodus, after a thousand years of vigorous development, from the ecclesiastical institution which had so long protected and directed its growth.

The historian should not, of course, overlook the great achievements of ecclesiastical Christianity, and the inestimable service it rendered to the long Middle Ages and through them to ourselves. When the Roman economy collapsed, and the peoples of central and northern Europe came tumbling into what had been the Empire, it was the church that educated this new Europe, not only in literary arts and in religious symbolism, but also in agriculture, building, and every economic skill. For a thousand years the church educated Europe. It preserved and propagated the political genius inherited from imperial Rome, providing ministers of state more educated and humane than their royal masters. For a thousand years it guided and moderated secular governments. And during this long period it firmly inculcated the truth, which Europe was not to forget until this twentieth century, that there stands above all kings and governments a moral authority which no political power may exert. Modern society could establish itself only after the disestablishment of ecclesiastical authority; but the free modern society which replaced medieval ecclesiasticism was, even in its libertarian rebellion, the child of that church, to which we must still owe a filial gratitude. Not to bring this gratitude is to lack spiritual maturity, and to have no claim to religious and intellectual liberty. Only what honors its origins lives long on this earth.

But the chief concern of this chapter is the intellectual

men from other individuals on the ground of their rational faculty. But this emphasis upon human individuality had always been a sort of joint or hinge in Greek philosophy, because it could not be derived from the still more basic conception which saw in individual things only the local and imperfect appearances of eternal and universal Being. Christianity went still further in its high evaluation of the human individual; and it did not identify what is eternal in the human individual with the theorizing intellect. Its conception of nature as a great drama of temporal creation required the attribution of some sort of absoluteness to individual being, in that it made individuals, and not specific or other eternal forms, the directive agencies of natural occurrence.

But the opposition between the new Christian concept of nature and the old Greek eternalism, although it was doubtless vividly felt, could not be easily stated, or immediately grasped in its tremendous implication; and the new faith had to make some sort of contact with the long intellectual tradition of antiquity, which still dominated the intellectual life of that time. So we find Christianity seeking to adapt its language to that of traditional Greek philosophy, and even to present its very different conception in terms of that philosophy. Neoplatonism, as the form of Greek philosophy most familiar to educated Christians, provided the vocabulary used to introduce Christian thought to intellectual society. At the beginning of the third century there was elaborated, chiefly by *Origen*, the pupil of Neoplatonist Ammonius Saccas in Alexandria, the Christian theology which for many centuries would largely replace, as authoritative Christian creed, the simpler and mightier faith affirmed in the earlier scriptures. The junction between Christian faith and Greek philosophy was effected by means of the doctrine of the Trinity, which interpreted the relation of Jesus Christ to God and to man in terms of the three highest forms of the Neoplatonic hierarchy of being. The supreme Being became God the Father or Jehovah; the Logos

tual difficulties. It is evident to the reader of his *Confessions* that Augustine's problem was a personal one. A man of exceptional intellectual power, he had found no great work to do, no lasting and cumulative purpose which would give substance and perhaps immortality to his achievements. The young and vigorous church offered the vehicle for his talents that he needed. What he gave to that church would go far, and be conserved perhaps forever. Just because Augustine was individualistic to the point of egoism, it was altogether essential for him to lose himself in a life greater than his own. In the church, he tells us, he found the release for his energies and the serenity of mind he had sought elsewhere in vain; and the egoist of the *Confessions* became the immortal author of *The City of God*.

Looking back to Augustine today, we see in him the prototype of modern man. He stands alongside Plato as the second of the two thinkers who have most forcefully determined our intellectual evolution; and with each year, as we more clearly grasp the constitution of this modern age, the figure of Augustine increases in stature. Unlike Plato, who consummated the thought of Greece, Augustine stands at the beginning of the intellectual age which is our own. No great systematist, his greatness lay in his grasp, seldom clear but ultimately effective, of the new conception of reality which moved in the Christian faith. Limited though he was by the vocabulary of Greek philosophy, Augustine was nevertheless able to indicate a new sort of apprehension of actuality. He accomplished this by implication and suggestion. He gave to old concepts new meanings, he bluntly rejected certain hitherto dominant concepts, and he created some new concepts. In their sum, these changes successfully communicated the new concept of reality which engendered them. It is scarcely too much to say that the history of thought since Augustine, especially the thought of the last six centuries, has been the struggle between Greek eternalism and Augustinian creationism; and today we must acknowledge Augustine the victor in this struggle.

tion of the human race through the creative agency of Jesus Christ and the church. Yet he never quite rejected the eternalistic theology of the earlier Fathers, who spoke of the world as the materialization of the timeless ideas of the *Logos* or the mind of God. However, Augustine's greatest and best-known work, *The City of God*, very definitely advanced a temporalistic or historical conception of reality. In this book the biblical story of the creation, fall, and redemption of man is expanded into a philosophy of history, which uses the narrative and prophecy of the Old Testament to portray a long struggle of earthly empires as the prelude to the advent of the true and divine government of man in the church. The Roman Empire is depicted as the latest embodiment of the powers of error and evil in the world; and Augustine hopefully anticipated, as well he might early in the fifth century, its final collapse. Augustine was not the first thinker to make use of history as a vehicle of philosophical truth; but he was the thinker through whom this philosophical approach, which earlier ages called "prophecy," was chiefly developed and transmitted to later times.

Augustine's reading of history as a long progress from more secular to more spiritual government is often dismissed by modern critics as a flagrant example of fatalistic or *teleological* explanation. Whereas science mechanistically explains later events as effects of earlier events which are their causes, the teleologist explains earlier events as the necessary antecedents of certain later events, their goal. Teleology, in short, extends the concept of purposive behavior to wider nature, as if vast nature revealed some purpose of its own. Thus for Augustine material nature was created to provide a home for the human spirit, and the long centuries of human error are shown to be the working of the will of God, who has determined man's salvation. It cannot be denied that Augustine does explain the history of nature teleologically, as leading up to its divinely intended goal or terminus; but the critic is incautious when he hastily assumes that such explanation is necessarily unscien-

Since all science and society are established upon these two apparently contradictory doctrines, it is for the honest and courageous thinker to attempt their reconciliation, by showing how their apparent contradiction can be removed. We do not further understanding by affirming one of the two doctrines, while glibly ignoring the other.

The intention of early Christianity was to extol spontaneous goodness, immediate responsiveness, ready feeling. It advocated more "life," *i.e.* more sensitiveness to the immediate present. It opposed "the spirit" to "the law," the claim of the present or future to the claim of the dead past. This attitude was and is deeply philosophical—however, it is philosophical in a sense directly opposed to ancient philosophy, which had always deprecated the present in the interests of the "eternal," *i.e.* the past. Therefore Christianity in its most essential doctrine, that of the spirit which fulfils and transcends the law, could not be absorbed into Greek philosophy; and it has always reacted with and upon Greek philosophy in significant and profitable ways. One of these ways has been its emphasis upon individual character. To subordinate the law to the needs of living men and women is ultimately to make individuals the source and criterion of law.

This individualism appears both implicitly and explicitly in Augustine's writings. It is implicit in his autobiographical *Confessions*. These, with their unrelieved and somewhat egoistic concern for the salvation of their author, are the prototype of the psychological literature widely current in our own day. No other work of antiquity is so modern in quality as this. Augustine shows here little awareness of the society around him, the well-being of which is the real goal of all his moral effort. He is concerned only with his own soul and its redemption; yet the solution of his private problem is his entrance into the Christian community, in which his individual life is identified, by an act of free will, with the larger life of the church.

More explicit is the individualism of Augustine's theory of

and love of truth, Augustine is able to argue the reality of God who created the world and implanted in us our love of truth. Descartes, early in the seventeenth century, revived this Augustinian doctrine, which has given to all modern thought its distinctive subjective character.

Augustine was the first great and original thinker, if we except Lucretius, who used the Latin language. The use of Latin affected western thought, since Greek concepts undergo some modification even in their nearest Latin rendering; but more important is the great influence which this use of Latin gave to Augustine in the west, where Latin was to be the language of scholarship for more than a thousand years. It is difficult to overemphasize this Augustinian influence in the development of western thought and life. The earlier Church Fathers had tied Christian theology to the rationalistic Neoplatonic philosophy. Augustine did not repudiate the earlier theology; yet he liberated himself from it, and liberated finally the thought of the west, by appending to it the individualistic, empirical, and creationistic doctrines we have noted.

The greatness of Augustine, and the enormous part he played in the shaping of western thought, are becoming recognized today. The positive and revolutionary character of his thought was not immediately apparent, for he usually said less than his doctrines implied. He retained the older theology alongside his own radical tenets; and he never, because he could not have done so, adds up his radical innovations and emphases to produce a total picture. But when, fifteen hundred years later, we try to sum up the modifications introduced by this remarkable thinker, in order to grasp the integral concept of reality which inspired and emboldened his thought, we are startled to find how different from that of any earlier thinker, and how like our own, was Augustine's vision of the world. This man, we conclude, was the first "modern"! And then we discover how, in historical fact, the thought of Augustine stimulated the late medieval movements which ushered in modern science and

10 THE LONG MIDDLE AGE

WE HAVE NOW OBSERVED THE DEVELOPMENT OF Greek science, in its effort to establish a universal knowledge grounding a just civic constitution; we have seen how realistic thought, following Aristotle, became idealistic, natural science becoming a moral system and the ideal constitution becoming a city of the sky; and we have finally noted how Christianity cut across this Greek movement at an oblique angle, retaining and even accentuating its moral emphasis, yet requiring a realistic actualization of the moral ideal in a redeemed human community. The final result of the long development was the establishment of a universal church, armed with a moral or spiritual authority which claimed precedence over secular power. To Caesar should be rendered what is Caesar's, and to God what is God's. To God, announced the Christian prayer, belongs the kingdom, the power, and the glory forever! Just what was assigned to Caesar?

For a thousand years the ecclesiastical organization centered at Rome retained this authority, and western Europe developed under a dual government of church and state. The complex relationship between the ecclesiastical and secular governments is the central theme of the long medieval history; and this relationship continues to play a much larger part than is usually

stagnancy, and not to be revived except by a return to the social and political poverty out of which they arose.

Feudalism appears at an early stage of many a developing civilization. When the western Roman Empire, separated now from the eastern Empire centered at Constantinople, fell into chaos as the result of turbulent migrations from northern and central Europe, a measure of order and stability was reached where local chieftains could establish their power by rigid military rule. As chaos lessened and migrating peoples turned to settlement and agriculture, military discipline became a system of land tenure, the ownership of land carrying military responsibilities. This was feudalism, a loose system of personal government which could and did develop into the great feudal hierarchy of emperor, kings, princes, lords, knights, squires, yeomen, and serfs. Normally, *i.e.* with peace and the development of artisanship and commerce, feudal government is steadily transformed into something else, even where the feudal forms and titles are retained. It should be observed that feudal government, although personal, is not absolute government. Each level of the feudal hierarchy has its rights as well as its responsibilities, and it is the duty of the individual to maintain these feudal rights, established by use or common law, against aggression from above and invasion from below. When war and the constant threat of war gave way to more peaceful prospects, the feudal system became artificial and self-destructive, corrupting into "chivalry" and bloody vendettas between noble families. The Wars of the Roses illustrate this dying feudalism in England. When the rival factions had sufficiently destroyed each other, Henry Tudor, as Henry VII, backed by the urban nonfeudal population, was able to establish monarchy in place of feudalism. The English people tolerated, indeed heartily supported, this Tudor dynasty in its usurpation of absolute power, until feudal claims had become obsolete; yet when the people rebelled against royal absolutism, they justified

pire with its own government, code of law, and courts. In many respects this great ecclesiastical state which crossed all feudal boundaries offered to the individual a life more free, more inspired, and more humane than might be found elsewhere. It was a question, indeed, whether this clerical government might not become the sole government of Europe. Yet the church itself, since its clergy was celibate, could not be identified with European society; and the great expansion of its economic and political responsibilities increasingly affected the character of the church, secularizing it and prejudicing its religious work. Thus the Middle Ages produced a well-nigh insoluble problem, a problem that was to convulse Europe in century-long wars and that has never ceased to disturb continental Europe. The problem was to keep religion authoritative while divesting it of secular powers.

Having brought this problem to an acute stage, the Middle Ages came to an end, the feudal and ecclesiastical systems crashing down together. Strong kings with the support of their commoners usurped the feudal power; the great ecclesiastical estates were confiscated and distributed, the clerical orders were disbanded. But the deeper problem was not solved by these strong-arm measures. Where was now the moral authority, the rule of the spirit, which ever since Emperor Constantine's recognition of the church had in theory limited tyrannous government? I am that spirit, said the absolute king; I am the head and fount of the church. And where was the common law, the inborn rights and powers that inhered in some measure in every feudal class? I am the law, said the king; all powers derive from me. So the fall of feudalism and ecclesiasticism, precipitated by strong kings who could sincerely and reasonably appeal to the crying need for radical political and economic reform, was followed by a period of revolutions, needed to establish once again the authority of moral man over established power. And we observe that such revolution was successful, permanent in its political establishments, and beneficial in its

early Christianity destroyed or allowed to rot the great libraries of later antiquity. That early Christianity prohibited the pagan literature is unquestionable; but since this literature was never lost in eastern Europe, where the Greek language remained in common use, it seems to have been the use of Latin rather than any deliberate prohibition that cut western Christianity off from Greek science and scholarship. However this may be, there is no doubt that the small library of writings which was retained by the western church had all the more influence in its determination of a distinctively occidental way of thought. This library contained the works of Augustine and other Latin Fathers in their Latin originals, and also portions of the writings of Cicero, Seneca, and Lucretius. In translation from the Greek there was of course the New Testament, and also portions of the Greek Fathers, a fragment from the *Timaeus* of Plato, parts of Aristotle's logic with a commentary by the Neoplatonist Porphyry, the *Consolations* of Boethius, and some philosophical commentaries. For some centuries the mind of western Europe was whetted on these few texts, which gave to western culture a vocabulary, a style of speech, and an orientation of thought which are still discernible. Just as a boy today might be better educated by the rigorous study of a few well-selected texts than by a large amount of casual reading, so it is possible that western Europe was blessed and not cursed by its isolation from the vast literature of later antiquity. One effect of this isolation was that the great systems of Greek science and metaphysics became known only when western society had developed itself far enough, in exercises logical and theological, to be able to meet Greek thought with a measure of independence. So there could arise and maintain itself that critical attitude of mind which is the chief mark of the western intellect. Our concern therefore with these Middle Ages will be the movement to this critical attitude of mind, as this movement was stimulated by increasing contact with the original thought of Greece.

The first contact of this kind was a strange one, occurring

translation of the Greek "idea" or "form." Porphyry in his commentary upon Aristotle's logic had asked: Are universals prior to the things which instance them, or in things, or after things, *i.e.* in our minds? Roscellinus answered flatly: in our minds, and only there, because all actual things are individual beings, and there is no being that is not ineradicably individual. This is the doctrine of *nominalism*, which affirms that universal or general terms are but names. We can give the same name, *e.g.* "dog," to any member of a class of similar things; but these things are individual beings, and we may not suppose that there is some nonindividual sort of being, *i.e.* universal Being, corresponding to universal terms.

This doctrine is at first sight plausible, and we shall see that it withstands criticism; yet the nominalist must explain why, if general terms refer to nothing real in nature, they are indispensable to all study and explanation of nature. Does theoretical science, which defines certain very general structures such as physical structure, chemical structure, etc., describe not a structure in nature but only a structure in our minds? The nominalist will always raise an adversary in the *realist*, who insists that universal terms refer to realities, not to names merely. So *Anselm of Canterbury*, the older and much respected contemporary of Roscellinus, rose to the latter's challenge with an able defense of realistic metaphysics. To deny the reality of universal Being, Anselm argued, is to forego all rational knowledge. To know the universal forms which reside in individual things is to understand things. It is to know why things behave as they do, and to understand their place and function in the universal system of the cosmos. Individual things are therefore intelligible and "real" only in virtue of these universal forms which they manifest, which forms therefore are most real. It is through these universal forms, moreover, that we are led to religious truth, since to pursue these causal and formal relations is to be led finally to the supreme Form and First Cause of everything, which is God. Thus to affirm universals is to affirm

modern period, in that it confined itself to book knowledge and traditional learning, and did not advance to conclusions based upon new evidence reached by original observation and experiment. Yet we should do justice to the scholastic method, even in recognizing its limitations. It was not subservient, since it required the scholar to weigh his textual authorities and to depend upon his own judgment. It proposed to advance beyond earlier opinion, by finding in the contradictions of past authorities an injunction to independent thought. Scholastic method at its best, for example in Abelard or Aquinas, was in truth a preparation for modern critical science; and without this first stage there could not have developed the second stage. In this first stage, the scholar aimed to master past thought, accepting its conclusions as evidence yet not as finality, in order to reach a higher and truer illumination. Such scholarly analysis, comprehending and weighing all existing knowledge, must always form an important part of research. In the second stage of this development, properly called "science," the thinker turns to observable fact and experiment for new evidence, derived not from books and past authorities but from nature itself. However, a true science will always comprehend the insight of the past; and the scholastic method was a proper and necessary prelude of the independent natural science of today.

Abelard's tragic history is a profound commentary on medieval society. The most brilliant young scholar of his century, he could anticipate a clerical career leading to the highest and most responsible offices in Europe. This career required celibacy; and Abelard fell in love with his lovely and gifted pupil Heloise. Heloise, vowing that she would rather be Abelard's mistress than the spouse of an emperor, refused to allow her lover to sacrifice his career by regularizing their union; and she retired with their daughter to a convent, where she wrote those letters which still make this story the most authentic and moving of the medieval romances. Abelard, emasculated by the indignant family of Heloise and publicly dis-

read Aristotle subserviently, as if the human reason had uttered in Aristotle its whole thought and must ever after only think that thought again. Yet it was nevertheless Aristotle who taught Europe to see in nature a great array of natural domains, each accessible to the natural light of reason and each delivering its appropriate science. And the rebellion against Aristotle, necessary and fruitful as it was, was never able to confine the broadened mind of Europe to a single narrow discipline.

It would take too long, nor does it belong within the purpose of this book, to try to portray the great system of Aquinas, which erects upon the flat architectonic of Aristotelian science the towering spire of Christian theology. *Thomism*, as we call this system today, became very quickly the unofficial, and much later the official, philosophical code of the Roman Church, which it remains to this day, when it is experiencing a vigorous revival in certain Catholic centers. The largest movement of modern science and philosophy, however, whatever may be its final or future constitution, has proceeded independently of scholastic thought, and to a considerable degree in hostile opposition to it. We will note, therefore, only some of the largest and most generally influential doctrines of the scholastic philosophy.

First, Aquinas defined the boundaries and legitimate functions of faith and reason, *i.e.* of revealed religion and theoretical science. Faith, he taught, reveals the goal toward which reason must strive, but which reason cannot of itself attain. Because the world is the creation of God's free and omnipotent will, it is a contingent world, *i.e.* it is a world the character of which cannot be deduced from any purely rational premises. This principle of the contingency of nature, which Aquinas derives from Christian doctrine, is truly the principle which calls for an empirical science, reaching its conclusions from observed fact, to replace the rationalistic science of antiquity. Aquinas concludes further that scientific knowledge must be less than complete, because the world, as the creature of an

natural law is the infinite and unknowable will of God. *Natural law* is the part of eternal law accessible to the human reason through its scientific study of nature. *Divine law* is the part revealed to man in transmitted religion. *Human law* is the realization of natural and divine law in legal codes, e.g. Roman and canon law, and in the *jus gentium*, the unwritten law regulating relations among nations or peoples. By means of this elastic or compendious doctrine Aquinas established the concept of a divine or natural law, supporting and realized in the actualities of government. This was a return to the Greek and Platonic ideal of government by law, which Aquinas thus helped to make a commonplace of political thought. Aquinas followed Aristotle in his conception of the state as a natural outgrowth of human sociability. He favored monarchy, as did in the thirteenth century most forward-looking thinkers, weary of the failures of feudal government. Also forward-looking was Aquinas' doctrine that the state, responsible at once to God and to the people, must secure the economic welfare of its citizens.

We should see in the scholastic system of Aquinas one of the great achievements and emancipating influences of medieval thought. It established the authority of a free natural science, proceeding from observable fact by way of rational analysis; it secured the authority of secular government, yet subjected this power to limitations both moral or spiritual and popular or legal; and it showed the dependency of both science and society upon moral foundations. The later centuries owe much to this great and liberal thinker, who combined breadth of classical scholarship with intensity of religious faith. Yet the work of Aquinas had very definite limitations, which leave it an achievement peculiarly medieval and unmodern.

Its most obvious limitation was its fidelity to the logic and science of Aristotle, whose method, as we noted earlier, constituted only one movement of Greek science, and not the most fruitful approach to fact. In the hands of men of less genius

lay membership of the church testified to the desire of the people of Europe to appropriate to themselves the religious insight which earlier had been the prerogative of the ecclesiastical priesthood. Very soon, it is true, the Franciscans organized themselves into a clerical order similar to that of the Dominicans; and only two centuries later did the Protestant Reformation erase in northern Europe the line between the priesthood and society at large. But the Franciscan movement foreshadowed, in its unpretentious and simple practice of religion and in its philosophical and theological leanings, the modern society that issued from the Middle Ages. Franciscan theology looked chiefly to Augustine, and gave to the creative thought of that great mind an influence greater than it had enjoyed; and the memory of St. Francis was preserved in a naturalistic mysticism which made the visible world an immediate experience of God. Thus *Buonaventura*, a contemporary of Aquinas and the first Franciscan philosopher, tells us to see in our immediate experience the small analogue of the universal and divine process by which God creates the world. Earlier theology had looked to the authority of tradition, derived from revelation in the past; but St. Francis, in the power of his direct experience of God, taught his followers a new way of truth, a new confidence in their powers of immediate apprehension, and a new conception of that ultimate Being which is at every time accessible to the earnest and illuminated mind. Following the lives and words of these thirteenth-century Franciscans, we feel that we are attending the birth of a new mentality, one that is modern, democratic, and empirical; and we are not surprised to discover in the writings of certain Franciscan scholars the initial steps of the science and philosophy of today. This modern way of thought we call "empirical" or "empiricistic," because it emphasizes experience rather than reason, even at the expense of reason. By "experience" is meant the immediate perception of sensible fact, and by "reason," in this context, is meant the conceptual formulations and explicit theories of the intellect.

whole business of science, he said, is to know clearly the small set of primary and universal principles basic to mathematical science, and to apply these principles, directly or through experimentation, to the observable phenomena of nature, which will everywhere reveal their perfect fidelity to mathematical pattern. He mercilessly castigated the loose and haphazard "learning" of his time, and was especially critical of Aristotelian science. He professed adherence to the established religion; but he called upon the church to cast out its unscientific philosophy, and to encourage this mathematical and experimental research. It is the virtue of this true science, he said, to give man power over nature; and this great instrument, if the church neglects its use, will fall into the hands of the enemies of the church and be used to destroy the church. The church did not respond to these vehement exhortations. It imprisoned the hot old genius during the last decade or more of his long life, none other than the saintly and gifted Buonaventura signing the order for his incarceration; and we shall never know what the church might have become if instead of repudiating its great son it had united the development of modern science with its own religious aspiration, and not required posterity to choose between scientific truth and religious orthodoxy.

The complete teaching of Roger Bacon is a matter of some obscurity. Only fragments of his writings are preserved, some of his works being inscribed in a curious cipher not yet decoded. But it is established that he was a great initiator of experimental theoretical science, looking to experience and attempting an independent analysis of observed fact. He seems to have united the mathematical faith of Plato with the new Franciscan and Augustinian insight into the potentialities of our immediate experience of nature. Just how Bacon united reason and experience we do not know; but that he did bring them together into a most fruitful union is shown by the long development of science and philosophy, reaching down to ourselves, which issued from him. In Bacon first was the great impetus of

are, Occam taught, two criteria or tests of knowledge, not merely one. The first is the rational criterion—our conclusions must be deducible from basic self-evident principles, such as the axioms of mathematics. The second is the empirical criterion, which requires that general knowledge must confirm itself in all observable particular fact. We saw how Eriugena in the ninth century first set forth this double requirement, which Occam in the fourteenth century restates in clearer language. It is this double requirement that distinguishes modern empirical science from all earlier science, which was rationalistic because it emphasized the first requirement to the neglect of the second. We must believe that Occam publicized in this way the scientific theory and practice proposed by his predecessor Roger Bacon. This means that modern science was inaugurated in its essential principles in the thirteenth century.

Equally important for the rise of empirical science was a second doctrine promulgated by Occam. The objective of science, he taught, is the discovery of causal relations among particular things. Medieval learning, following Aristotle, had found the causes of individual things in their specific forms, *i.e.* in the conformity of particular fact to general forms, which constitute in this view the general causes of particular events. (So today we might explain the motion of the moon as a particular instance of the general "law" of gravitation.) In a slashing attack upon the scholastic science, Occam rejected this sort of explanation as merely verbal. To classify a thing as a member of a certain species, or to classify an event as a certain sort of event or as the instance of some law, does not inform us concerning the cause of that thing or that event. The causes of a particular thing or event lie in other *particular* things or events. (Thus although we say that the motion of the moon is an instance of the law of gravitation, we mean that the moon is determined in its motion by the action upon it of particular forces exerted by particular bodies, chiefly the earth and sun.) There are in every occurrence or change, it follows,

must be something in individual things which corresponds to the general formula and is truly indicated by it. But we forgive Occam's error because of the value and truth of his positive account of science. Occam's strictures upon scientific method became a deathblow to all forms of scholastic, merely rationalistic science, and the foundation of an empirical science which derives its hypotheses from experienced fact and confirms them again therein.

We have given considerably more space and importance to these medieval Franciscans than is usually accorded to them. Our purpose is to correct the still prevalent superstition that modern science suddenly appeared, without notable antecedents, at the time of the Renaissance. We must insist that modern science in its distinctive character was initiated by these clerics working in the thirteenth and fourteenth centuries. What was the deep and obscure feeling which motivated these men, whose thought was to transform the human intellect, and through this the human world? What compelled them to rebel against all the scientific and philosophical authority of the past? What insight gave them their moral courage and their scientific power? In their own day, remember, they could appeal to no great body of empirical achievement such as exists today. For their scientific experiments they were suspect in the public eye, as devotees of the "black art" of magic. For their philosophical teachings they were persecuted, ostracized, despised by their learned fellows. Bacon languished in prison; and the name of Duns Scotus became the scornful epithet "dunce," hurled by orthodox scholars at these subversive non-conformists. Did these followers of St. Francis see a new world because they strained toward a new society, a society emancipated from the political bonds of feudalism and the intellectual bonds of medieval ecclesiasticism? Was their intellectual rebellion the van of a social and religious rebellion? The early Greeks established Greek science because they insisted that nature, like Greek society, must manifest a legal constitution,

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democratic government must have consequences in the domestic, educational, recreational, social, and religious activities of a people.

While it is proper to describe modern society in terms of these distinctive political and social institutions, the word "modern" indicates a direction of social evolution rather than any set of fixed institutions. The American colonies were evidently moving toward democratic government; yet they still retained much that was undemocratic and old-world. Democracy is a direction of thought and life. It is a movement that began some centuries ago, and that will indefinitely continue its transformation of social institutions and human character.

Between this modern movement to democracy and medieval feudalism occurred a transitional period marked by monarchical government. The rapid breakdown of feudal institutions under the stress of new conditions made a temporary dictatorship inevitable. Monarchies were established wherever some able and ambitious feudal lord, supported by a public seeking escape from feudal forms, was able to enlarge his feudal office into that of sovereign. In this way developed nations, or societies centrally organized around the monarch, in whose person was centered and symbolized the national unity. England best illustrates this transition from feudalism to a more modern form of government. Henry VII ended the destructive wars between feudal factions, established royal power, carried through legal and economic reforms, prevented the recovery of the feudal nobility, and encouraged the development of national industry and commerce. He and his Tudor successors exercised virtually absolute powers, which they owed to their able and firm government and to their encouragement of commercial and urban interests which had found no place in the feudal system. The English parliament, a representative but still feudal institution, could not prevent this monarchical assumption of power; but it kept alive the memory of feudal rights, and never acquiesced in the theory and practice of absolute monarchy.

movement to democratic government, was that of religious freedom. The Stuarts had long resisted the Presbyterian Scotch, who wished to retain the management of the church in their own hands. Finally, when the Presbyterians threw out his appointees, Charles I summoned the English parliament to vote him monies to suppress these rebels. Parliament, itself mainly Presbyterian, voted instead to support the rebels, and declared war against Charles. The parliamentary armies were largely composed of Puritan dissenters officered by Presbyterian gentry; and when parliament moved to make terms with Charles, these soldiers took power into their own hands, set up a tribunal which tried and executed Charles on the charge of high treason, and established the Commonwealth, a form of government which was neither monarchical nor parliamentary.

This English revolution established the political principle of the supremacy of law. Charles I, who had claimed to be above the law, was executed for breaking the law. It is often forgotten that this revolution also proceeded to the establishment of a republican form of government, enabling a people to rule itself directly through its moral and religious leaders. Since the Stuarts had alienated almost every section of society, the revolution against them was variously motivated, economically, socially, and politically, as well as religiously; but it is impossible to mistake the dominantly religious origin, motivation, and outcome of this first of all the revolutions that have modernized society. The British people, having rejected the authority of Rome and subjected themselves to a Puritan discipline of their own making, proposed now to preserve this religious and moral power from royal interference, and to make of it the ruler of their land. It was a Puritan revolution, issuing in a Puritan government.

To be convinced of the moral and religious motivation which impelled the movement to modern democratic society, one must observe that only where the movement of Puritan reform was able to advance with relative freedom did the movement

much. There, as earlier in Tudor England, the established clergy sided with the national monarch in his struggle against papal authority; but they later required, as recompense for this support, his persecution of the reformed religion. Here, too, the consequence of the Reformation was to identify an established church with a royalist and absolutistic form of government; and the struggle for political liberty became anticlerical, and in its theory atheistic. The French revolution was accordingly long delayed and unusually bloody and bitter, and the republic which it established was never stable. This has been the history of every libertarian movement which was not supported and strengthened by free religion.

The seventeenth century was remarkable for its production of political pamphlets. This literature was an outgrowth of the religious and theological literature, also tremendous in bulk, which had followed the Reformation. After the failure of the Commonwealth with its Puritan objectives the liberal thinker turned increasingly to philosophical and moral principles in his effort to substantiate his political purposes. The political theory developed during the later seventeenth century was the chief instruction of those who gave to modern society its political constitution; and among these political theorists one name, that of John Locke, outranks all the rest.

The purpose of the creators of modern government was to enfranchise and empower the individual conscience, by making effective in every individual his religious responsibility for all of his fellows. This responsibility, it was now clear, could be fully exercised only through a control of government. Yet how could the freedom and power of the individual be reconciled with the fact of government? How may law, with its restriction upon individual behavior, leave unimpaired the moral power of the individual?

During the Middle Ages this crucial problem had been partially solved by a division of the governing power among feudal ranks and between church and state. The degree and kind of

and solidly organized people, defined in terms of their possession of territory and their political unity. The nonmoral character of this "realistic" political theory is starkly apparent in its two best-known exponents, Machiavelli and Hobbes.

Machiavelli, a Florentine who wrote early in the sixteenth century, was inspired by his too idealistic conception of ancient Rome. He dreamed of a strong and united Italy, and looked enviously toward France and England, which had already achieved national solidarity. Several causes had kept Italy divided into warring principalities, the chief cause, Machiavelli believed, being the concern of the Papacy to keep intact its papal domains. What Italy needed, he concluded, was a prince whose personal ambition would override all religious and other scruples, and whose skill in intrigue and war would enable him to unify Italy by sheer force. In his famous book *The Prince* he presented a manual of advice and instruction for such a tyrant. Machiavelli was a genuine patriot, weary of the political turmoil and the moral corruption which he saw about him; and at heart he was a liberal, one who would revive the virtues of stout and honest citizenship as they had supposedly existed in republican Rome. He assumed, however, that this patriotic purpose justified every intrigue, deceit, and violence. He calls for a ruler whose power over his people is absolute, and who will use education and religion to keep his subjects devoted to himself and to his political ambition. Machiavelli's book, full of sincere, shrewd, yet cynical perception of the baser motives playing into political life, has been for four centuries the guide of unscrupulous statesmen, until its essential doctrine, teaching that the state as the whole source of law and right transcends moral limitations, became the creed of a new tyranny in Mussolini, Franco, and Hitler.

More than a century after Machiavelli, this doctrine of political absolutism was given systematic expression by *Thomas Hobbes* in his book *Leviathan*, still regarded as a classical work because of its bold effort to deal realistically with the forces

equally manifest one and the same law which is that of universal and divine justice, Hobbes defines the individual and the state in such a way as to make their reconciliation impossible. The individual is defined as in his inherent and constitutive nature lawless, wholly belligerent, and nonmoral; and the state thus becomes something superhuman, imposed upon the individual by an external and alien power. Hobbes did not hesitate to call the monarch "a mortal god." His theory is close to that of the Greek sophists, who held all law to be nothing but artificial convention, without real authority and imposed by force or deceit. The concepts of natural rights and natural law have never wholly recovered from this Hobbesian interpretation.

Hobbes' intention, of course, was to justify political authority as the true law, that of reason and morality; but he defined the individual in such a way as to allow no relationship between individual freedom and rational or moral law. Law must be imposed upon the individual from without, by an external force. To justify and explain this imposition, Hobbes gave to another current idea, that which held government to arise out of a contract, a new and strange interpretation. The Epicureans, it may be recalled, had used this contract theory to deny moral authority to the state. The state is in the position of a contractor, they held, commissioned by society to perform certain specified and limited functions. Hobbes, however, describes a strange contract according to which the individuals composing society irrevocably renounce all their inherent powers, and place these without residue in the hands of the sovereign, who undertakes in return to make the good of the state identical with his own good, to maintain law and order, and to delegate to his subjects only such powers as will not disturb the common peace. This implies that all real individual rights, as distinguished from those "natural rights" which according to Hobbes are just lawless powers, derive from the state or the monarch; and this is the constitutive principle of

was generally conceived to establish the principle of self-government. In the writings of its spokesman Locke, indeed, this revolution produced the classical exposition of democratic theory.

John Locke, son of a small landholder whose services in the first revolution had depleted his fortune, qualified himself as a physician, but remained at Oxford pursuing scientific and scholarly research until his close relations with certain Whig noblemen caused the Stuart monarch to demand his dismissal. Locke went to Holland, where with other conspirators he prepared the way for the Whig revolution. Following his return to England with the new monarch, he published in rapid succession the political and philosophical works which he had prepared in exile.

Since the Stuarts and their supporters defended absolute monarchy on the principle of the divine right of the king, Locke directed his chief attack against this doctrine, and not against the more systematic theory of absolute government presented by Hobbes; but the positive argument of Locke constitutes a criticism and correction of Hobbes' theory. Rebutting the doctrine of divine right on its own ground, that of scriptural interpretation, he offers a defense of self-government which is independent of religious premises.

Starting as did Hobbes from the concept of the self-determinate individual, Locke immediately diverges from Hobbes in his conception of the individual, whom he finds to be naturally, prior to all government, bound to his fellows in moral association. Thus the initial concept of Locke is really that of a society or moral community, composed of free individuals who are bound to one another by reciprocal friendship and concern. This moral individualism of Locke is often confused with the nonmoral individualism of Hobbes and others; but this confusion leaves Locke's political philosophy quite unintelligible and robs his theory of all moral basis. The initial principle of democracy places all moral responsibility in the individual per-

tion of this theory, as it must be the intention of any theory which proposes to invalidate absolute government, to deny intrinsic authority to the state, and to locate all authority and all ultimate power in the people, which is conceived to be independent of the state, to be prior to the state, and to outlast the state.

The foundation of this theory is its affirmation of the goodness of the individual human being. Only if man is moral can he be worthy or capable of self-government. This does not mean that man is always and everywhere incapable of evil. It means that man is essentially or generally good; above all, it means that no line can divide people into two species of beings, one good and therefore worthy of exercising government, the other bad and therefore unworthy to govern. If men are generally good, and all men govern, government will be generally good. But the goodness of man lies finally in his free moral will. It is because man is a free moral agent, able to know and choose between good and evil, that he is invested with inalienable authority. No individual and no group of individuals has the right to deny to another individual or group of individuals the exercise of moral judgment and power. Democracy is the only form of government which does not at some point deny this conception of the moral nature of man.

Since all authority or right whatsoever inheres in the human individual, one cannot exhaustively list the "rights of man." Locke emphasized especially, as natural rights which require a specific limitation of governmental power, the rights of religious freedom and of property. It should be obvious that an individual can delegate to no one else his religious responsibilities; and just government may accordingly exercise no authority of any sort over religious belief. Locke extended this requirement of religious toleration to all save Romanists, who, he believed, were by their allegiance to Rome compelled to deny toleration to others, and thus prevented from entering into the compact establishing free government.

therefore, of the right of a people to regulate through its government its economic life. Why, therefore, should there be any limit to the extent of this economic regulation? If government is controlled by the people, should not the people through its government exert complete and absolute economic control?

To answer this question intelligently, we should observe that every sort of control exercised in human society is either directly economic, or dependent upon economic means. This is true of the control exerted by a people *upon* its government, as well as that exerted *through* its government. Laws are not effective until they are administered; and the administration of law is effected and controlled by means of monetary appropriations. It is not enough, in order to know the political form of a society, to know its written constitution. The written constitution may appear to be democratic, yet leave government autocratic. The constitution is effective only if it is materially implemented. But we learn the political form of a society unmistakably when we discover the sources and controls of the monies and other economic powers at the disposal of its government.

Thus a government not dependent upon appropriations, ultimately derived from taxes voted freely by property owners, may hire an army which makes it independent of every control—except, perhaps, that exerted upon government by the army itself. Governments are in the last resort groups of men; and to place in the hands of any group of men complete control of the national economy will automatically place those men beyond popular control. This is not only a theoretical deduction. It is also a generalization from facts which have always been apparent. There are countries today in which such complete economic control not only makes government completely independent of public opinion, but places it beyond the threat of popular revolution. Thus the proposal to secure to the people complete control of its economic life by means of government ownership, or unlimited governmental power over

private ownership, Locke also provided the means which would preserve this principle from abuse. He did this by defining property as the product of labor. Locke meant, of course, every sort of labor, and did not narrow the term, as we unfortunately narrow it, to specify only certain types of economic activity. This principle, taken in its whole meaning, provides a basis for broad legislation securing to all individuals that economic justice which is in fact, most would agree, a condition as well as an objective of democratic practice.

Locke's political philosophy gets its full weight only when it is placed in the context of his general philosophy, which we will consider in a later chapter; but it constitutes as it stands the classical exposition of democratic political theory, and the basis upon which was erected and still is established the constitutional democracy of today. The theory is not affected by any criticism of the concepts of "natural law" and "natural rights," in terms of which Locke presented it. This language, appropriate to Locke's time, only denoted the facts of moral responsibility and moral community which every adequate social and political theory must recognize. There are really only two kinds of political theory and practice. There is democratic theory and practice, which places moral authority in the individual human being and derives all governmental powers and social values from this; and there is absolutistic theory and practice, or the "philosophy of the state," which ostensibly locates authority and value in some institution, but really locates it in some hereditary or self-appointed group of individuals, identified with the state.

Democracy is not one of a number of political forms, among which we may choose that most appropriate to present circumstance. Democracy cannot afford to be relativistic. Democracy is the acknowledgment in theory and practice of the fact of individuality, which fact is the source of all natural moral law. As we shall see later, democracy is the practical application in human relations of those selfsame principles which in

preciation of the development of modern science, allowing us to understand its method and to grasp its presuppositions. This study, which we begin in the following chapter, will be our concern to the end of the book. Just as Greek philosophy was a reflection upon Greek science, so modern philosophy has been a reflection upon the methods and results of modern science, especially in their implications for social and political life.

Notes for Further Reading

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and primarily it was an exodus out of the cloister, into the several vernaculars of western Europe, of the Latin learning of the medieval clerics. It was also a recovery and temporary adoration of the classical and pagan cultures of antiquity. But finally and most importantly it was the expression of a new outlook upon nature and man, a new attitude toward fact, and a new enterprise of the human spirit. This new mind eludes definition, but we can perceive and indicate its most important features.

First, perhaps, we should note its great swing to an orientation upon the future, after centuries intellectually focused upon the past. Out of this reorientation was born the most dynamic and creative as well as the most revolutionary and turbulent force in the modern world, to wit the concept of progress. The new vista upon an unlimited human progress is perhaps the deepest meaning of the phrases, such as the Renaissance, the Enlightenment, and the Age of Reason, which men coined to express their satisfaction with and their confidence in the new prospect. This concept of progress was incorporated into and supported by the new science. Greek science, and after it medieval science, had conceived of a completed wisdom, progressive perhaps in its application to new situations and problems, but essentially static and whole. Socrates had not been able to convert men to his conception of science as a *pursuit* of knowledge, something at once less and more than the possession of knowledge; but modern science has conceived itself to be a progressive exploration of nature rather than a final statement of eternal and fixed truth. With this increasing faith in a progressive science has come new faith in the continuous improvement of human nature and the conditions of human life. We find the distant origins of this new faith in the gospel of hope and deliverance announced by early Christianity. Medieval Christianity had fixated Christian faith upon a supernatural and otherworldly goal, to be attained only after death; but the Reformation, returning to earliest Christianity

The earlier poems and comedies of Shakespeare we may dismiss, since they illustrate chiefly the superficial neoclassicism which is sometimes still identified with the Renaissance, but which was truly only its accident. In this neoclassical art the artist tried, impossibly, to re-create the thought and imagination of Greek antiquity; and he succeeded only in appropriating the archaic mythology and the external conventions of antique art, grasping nothing of the antique spirit. He remained still a fifteenth- or sixteenth-century European, rather ludicrously cavorting in tunic or toga.

The historical plays of Shakespeare, however, already boldly innovate the realism of modern art. If these plays are read in the chronological order of their events, they will be found to constitute a single drama of epical dimensions, telling of the curse with its fatal repercussions which was the War of the Roses, the curse being lifted and the bloody sequence ended through the accession of Henry Tudor. The theme is reminiscent of the great trilogy of Aeschylus; and Shakespeare's new realism appears in this, that where the Greek poet took his theme from mythology, Shakespeare made use of not so distant history to portray the working of natural and moral law. Here in modern art, as in modern science, is a subordination of imagination to historical and particular fact.

But it was in his tragedies, and especially in *Hamlet*, that Shakespeare reached that mental and moral crisis out of which sprang his supremest art, revealing his full and still immeasurable stature. In the earlier tragedies he had still conformed to the medieval roster of virtues and vices. Othello is jealousy, Coriolanus and Caesar are ambition, Macbeth is vacillation, Lear is vanity masked by paternal fondness. But in *Hamlet*, Shakespeare calls into question the moral foundations of the universe. That unusual impartiality, with which in the earlier dramas both heroes and villains are sympathetically understood, now becomes the center of the play.

It is customary to call *Hamlet* a work so profound as to be

philosophy, and ethics of the last three centuries. It is not an irreligious, still less is it an immoral naturalism; but it is religion and morality without dogma, in pursuit of widening vision and creative power.

The intellectual revolution and inauguration which genius such as that of Shakespeare and Buonarroti announced in art had its theoretical parallel in science. To the Pole *Jan K  pernik* (1473-1543) we credit the "Copernican revolution" which was so much more than an astronomical hypothesis affirming the revolution of the earth about the sun. Why did the Copernican theory arouse such dissension, such ardent support and resolute opposition, that intellectual Europe was divided by it into two belligerent camps? From the viewpoint of today, the Copernican astronomy only further applied the scientific method initiated by the Pythagoreans, and cultivated in some measure throughout the intervening ages. Strictly speaking, this solar-centric astronomy constituted only an appropriation of Greek science, with its commitment to mathematical principles and celestial spheres. Copernicus gave to the circular motions a new center in the sun; but this had been proposed by Aristarchus of Samos shortly after 300 B.C.; and we find that Copernicus gave due credit to his Pythagorean sources. Yet this Copernican hypothesis shocked western Europe out of its dogmatic slumber, by requiring a new and strange conception of the world. It returned, after centuries of Aristotle and Aristotelianized Platonism, to the mathematical methods of Pythagoras and Plato himself, ignoring and discrediting the Aristotelian science which was now the basis of scholastic theology and the content of scholastic learning.

Secondly, because the work of Aristarchus had been neglected and forgotten, the hypothesis appeared as a bold and independent advance going beyond all earlier achievement; and thus it established the intellectual parity of living man with antiquity, or even his intellectual superiority. For seventeen or more centuries the conclusions of fourth-century

they worked steadily and creatively, in England and later in France, to produce the discipline which has developed into modern physical science. After Occam, who directed the new science on its way, we find Nicholas d'Autricourt applying atomistic concepts, to facilitate the reduction of particular causal sequences to measurable and mathematically formulable displacements. John Buridan fashioned the fruitful concept of impetus or momentum. Albert of Saxony defined the center of gravity of a body and the principle of gravitational acceleration. And Nicholas Oresmus elaborated the mathematical calculi which made possible the applications of these concepts to particular physical situations. These and other medieval thinkers, most of them Franciscan clerics, created the terrestrial physics which in the hands of Newton was to be mightily enlarged, to swallow up the celestial astronomy of Copernicus and Kepler, and to establish the universal yet empirical study of fact which is modern science.

During the fifteenth and sixteenth centuries, however, the new science emerged from the cloister, and was much stimulated by its application to secular and practical uses. Navigators looked to it for new instruments and for a new cartography. Builders of ships, docks, and canals encouraged inquiry into the principles of hydrostatics, discovering the stresses exerted in and by fluids. There was considerable invention of simple machinery applying mechanical principles, and a great development of mining and metallurgy, often scientifically directed. Merchants encouraged the invention of new methods of calculation and bookkeeping. It was a great age, holding in embryo the industrial world which was to come. Most notable of these practical interests encouraging science, it must be confessed, was the desire for new arts of war, which stimulated Galileo's study of the motion of projectiles.

Galileo Galilei of Pisa (1564-1642) owes his popular fame to his confirmation of the Copernican theory, and to his adherence to this hypothesis in face of ecclesiastical opposition. Sum-

The principle of gravitation states that material bodies will attract one another according to the product of their masses and the inverse square of their distance. Why attract, and not repel? Why attract according to the product and not the sum of the masses? Why the inverse square, rather than the inverse cube, of their distances? There is no answer to these questions, except the answer that this is the way in which material bodies observably behave. The principle, in short, is *inductive*, not rational—it is a summary of particular observations, not the deliverance of a prescient reason. Newton, as a matter of fact, entertained many alternative and equally reasonable hypotheses, before he discovered that which exactly conformed to his data.

If we will keep steadily before our minds this character of the principle of gravitation, a principle at once *universal yet inductive or empirical*, we shall follow with understanding the whole later development of modern thought. The significance of this principle is its implied teaching that the whole character of nature, even its largest, most ultimate, and most basic character, is to be known by *observation and in no other way*. Modern science accepts this implication. We therefore call it “empirical science,” indicating in this way that its conclusions are derived wholly from sense-experience. Because Greek and medieval science believed the largest principles of knowledge to be established by reason alone, and to be applied to experience and imposed upon experience by the reason, we properly call that earlier science “rational” and “nonempirical.”

Newton may properly be regarded, therefore, as the chief founder of modern science. In the principle of gravitation he confirmed and securely established the science which his predecessors, from Grosseteste and Roger Bacon onward, had initiated. The later seventeenth and early eighteenth centuries dimly felt this peculiar importance of Newton's science. They saw in Newton the great frontispiece of a new “age of reason,” and the source of a new “enlightenment.”

genuinely empirical, we see; yet it still confused inductive knowledge, reached by observation, with rational principles supposedly inherent in the mind prior to experience. Was it materialistic, or Platonic? It was Platonic in its mathematical approach and in its mathematical anatomy; but did it not seek to explain everything as a consequence of the motions, distributions, and inertias of material particles? In a sense it did; but it recognized also the two infinite media of space and time, which support and condition all this mechanical occurrence; and space and time seem to be immaterial. But are space and time effective? Are not space and time just passive conditions, necessary to but in no way determining mechanical occurrence? Newton himself spoke of space as the sensorium of God, meaning that it functions as a divine medium conditioning everything that happens, but affecting everything equally, so that its effect cannot be measured and may be canceled out of our calculations. Today the physicist inclines to believe that space is effective, and that it conditions material motion variously and therefore calculably; but he is also inclined to explain the character of space at any place as determined by matter at or near that place, and this is again a materialistic view. Today we are aware of radiant energies such as light, which do not conform to the formulas applicable to solid matter; but Newton, who developed this science of light, conceived light to be made up of material corpuscles; and contemporary science now conceives of the transmutability of radiant energy and matter.

We should conclude, perhaps, that the Newtonian science was materialistic, but that it raised the question of the relation between the material constituents of nature and the fixed "laws" or principles which these constituents seem to obey in all of their motions. The question is whether the universal principles are determined by the material motions, or the material motions determined by the universal principles. The seventeenth century was apt to answer this question unhesitatingly, uncritically, and piously. The principles were taken to be the

tively perpetuates itself in the individual uniqueness of things?

Unfortunately these questions have never been put with sufficient clearness by later philosophy. Two habits of mind have worked to prevent a clear discernment of the problem, as it is perpetuated in modified form in modern science. The first of these habits is just the Greek and medieval philosophy itself. Where the thinker did not clearly perceive the difference between modern science and earlier science, namely its departure from the Greek dualism, he did not give up the now obsolete concepts of form and matter, but tried confusedly to make use of them in estimating the results of modern science. The second obstructive habit of mind was that established by the medieval nominalists. Why not say, said the nominalists, that particulars alone are real, and that universal forms are just mental fictions, resident only in the mind? This easy disposition of the problem still appeals to overspecialized and myopic minds. Why not suppose, these contemporary nominalists say, that our scientific theories are only useful mental constructs, facilitating the recall or anticipation of particular sense impressions? Suppose we do say this—have we solved our problem? Do not these mental constructs still *function* as universals, whenever we use them in relation to particular sense-experience? And do they not *exist* in ourselves? We do not solve the problem of universal knowledge by confining universals to the mind. We only renounce all hope of solving the problem, or forbid its discussion. The real problem is still where it was for the Greeks, in the world and not in the mind. To know how and why we can have a general knowledge of facts which in themselves are wholly particularized, we must know how and why particular things or particular events conform, or at least seem to conform, to general and universal principles. Why are things so similar, and similar in just such and such ways?

The result especially of this second habit of mind was to convert a real and genuinely scientific problem, namely the

Plato pointed in the right empirical direction when he instructed his students to "save the appearances," *i.e.* to work toward the closest conformity of hypothesis to observed fact; but modern science is not concerned merely to save the appearances—it makes the appearances its whole criterion of truth. Modern science is hard put to save the theory. Modern science is faithful to Plato in its pursuit of theoretical knowledge, mathematically formulated; but it conjoins with the Platonic rationalism, first, Aristotle's identification of real being with individual being or particular fact; and second, the Greek atomist's denial of chance, his insistence on complete causal determinism. Nothing in intellectual history is so astonishing, so strange, so disturbing, and also so pregnant, as the successful union in modern science of principles which to earlier thought seemed irreconcilably incompatible, and which to many erudite minds seem so still.

Notice finally that the new science, at least in its Newtonian form, comprised a great philosophy or metaphysic. It postulated the reality of ultimate material particles, moving in the independent and infinite media of space and time, and causally influencing one another according to a definable set of universally effective principles. So universal and comprehensive a conception constitutes a philosophy, a metaphysical system. We can, of course, proceed to further philosophical discussion of the problems which arise in the persistent application of this science, or which dwell in its inherent implications; but this should not blind us to the fact that a science like modern physics is itself a philosophy, at least if we believe in it and accept its results. We cannot simply accept physics as "science" and then have recourse to another science, which we please to call "philosophy," for our preferred truth. If we accept science as scientific truth, we are committed to a philosophy which will comprehend and be relevant to the findings of science. The Newtonian science, of course, has been expanded and modified, recently in very radical ways; but it still at any and

Until the twentieth century, modern society was upborne by this tide of faith, out of which was generated great strength, high achievement, and a very real sum of human good. In the strength of this faith it transformed itself, not everywhere but in strategic areas, into the great democratic, intellectualized, and industrialized economy we know today. No faith less wide or less ardent can support this tremendous organized economy of life and work. It is not merely the further progress of man, it is the continued existence of modern society that depends upon this faith. The hope and faith of a society is the measure which finally shapes and governs all of its history.

During the nineteenth century, eloquent voices called into question this modern faith. Thoughtful minds became confused and uncertain as the modern age revealed its material potentialities, and there was a loss of nerve. In the twentieth century, intellectual leaders especially in European society began to separate themselves from "the masses" which still adhered to the now familiar faith in a progressive justice and truth. Confused and misled by these leaders, and perverted by more sinister forces, European society became torn by international and social conflicts, which already in our own time have well-nigh completed its ruin. The somewhat perfervid idealism of the earlier centuries gave way to skepticism, pessimism, and moral atavism. To many, it seemed that the science which had promised complete insight had failed to reach objective truth, or had provided only a trivial truth which tells us nothing of what we most need to know. Society appears less like a moral community, it was felt, than a battleground of ceaseless warfare between pressure-groups; and the vaunted movement of progress, it was concluded, is but a foolish and unintelligible dogma, incompatible with a science which finds in nature only a determinate but nonmoral sequence of events.

So time has brought us through another of its apparent circles, setting us again where Plato stood when he defended the intellectual and moral faith of Greece against a sophistry

13 THE RATIONALISTIC PHILOSOPHY OF MODERN SCIENCE

IN THIS AND THREE SUCCEEDING CHAPTERS WE WILL discuss the two chief trends of thought, respectively rationalistic and empirical, which were stimulated by the development of modern science, and which proposed to establish more firmly, and to elucidate and explain, the method and presuppositions of the new science.

In pursuing this effort, philosophy becomes increasingly separated from science, at least in name. Earlier, science had been but "natural philosophy." Even in the nineteenth century scientific treatises were still published under this title. We pointed out that Parmenides had distinguished philosophy from science when he concentrated his attention upon the theoretical or logical form of Greek science, in abstraction from its specialized content. But this distinction, although perpetuated in the study of logic (which engages the form of scientific language in abstraction from its content) had not been supposed to involve a separation of philosophy from science.

Today a good deal of confusion attends this subject of the relationship between philosophy and science. Their true rela-

best illustrated by chemistry. There are still a few thinkers who attempt this impossible inclusion of all fact within a special science. The best-known form of this fallacy is the brand of materialism which would force physics or chemistry to swallow all other science. It should be clear that if the sciences did really compose only one science, scientists would have established this unitary science themselves, by empirical methods. The multiplication of special sciences is conclusive evidence that fact does not reduce to any one special hypothesis; and to insist that it must do so is merely a form of rationalism or dogmatism, an insistence that nature must be what we personally desire it to be.

However, over and above this fact of the plurality of special sciences, there is another and more compelling fact which precludes our elevation of any special science, or even the sum of the special sciences, into a universal comprehension of fact. This is the presence within each science of an apparent contradiction. Modern science rests firmly upon two criteria of truth. One, the primary and dominant criterion, is the shape and character of observable particular fact. The other criterion, subordinate but still indispensable, is logical consistency. Modern science assumes that *some* theoretical formulation will comprehend all the evidence of particular fact in a given field; and it is this assumption which supports rationalism, which stresses the conformity of nature everywhere to logical principles. Modern science escapes dogmatism, in spite of its apparent rationalism, by its readiness to abandon any and every theoretical formulation, even the most comprehensive, which fails to satisfy all of the empirical evidence. This compromise works excellently, and is the generating dynamo of scientific achievement; but it does not explain itself, it constitutes an apparent contradiction. The rationalistic or logical requirement, effectively applied in every pursuit of large theory, postulates some universal character in nature to which all particular fact *must* conform; but the empirical requirement postulates the

somewhat to include in its chronological place the work of Francis Bacon.

As we began our account of the rise of modern science with some mention of Copernicus, we may well begin this summary of modern philosophy with Bruno, whose speculation was in many ways an effort to appreciate in its full significance the revolutionary Copernican theory. The life of *Giordano Bruno* (1548-1600) is the vignette of a stormy and religiously convulsed age. Born in Naples, he was early initiated into the Dominican order. From this rigorous discipline he fled to the Protestant church, where he found even less comfort. He then wandered persecuted over Europe, teaching, quarreling, publishing when he could. Finally he was betrayed to the Inquisition, which burned him at the stake for his heresies.

Bruno's blessing and curse was an intellectual imagination willing to draw from the Copernican hypothesis its maximum consequence. If the earth is not the center of the universe, he argued, there is no center, nor any conceivable bound. The universe is infinite and homogeneous, and any part of it is as important and representative as any other part. God is equally manifest in everything—there is no privileged and locable "heaven." The infinite universe displays the infinite being of God. Infinity cannot be extensively grasped. We can know nature only intensively, in its individual items. The item we know best is our individual self, of which we have an immediate and concrete intuition. Reflection discovers in the self a creative activity or moral will which is the microcosm or small edition of the universal macrocosm, the infinite activity of God. Our understanding of reality must be exploratory rather than definitive. Nature is like a face, which we comprehend by appreciating its several parts in their relationship. Our personal lives similarly set forth our souls or characters, because they are the creations of our wills. The infinite character of God is therefore revealed to us, in some degree, in all the visible creation of nature, which it is our duty and privilege to study

brilliant special pleader, together with his high position, gave him an intellectual authority which was out of proportion to his limited knowledge of science; but his fame and abilities made him the most successful advocate of modern science. Even Bacon's limitations probably served him well—they were those of the European public he wished to influence. A Hume or a Kant would have had less immediate success.

Bacon's work had two sides, respectively critical and constructive. He opened his *Novum Organum* with a blast against all medieval learning and scholastic philosophy. Earlier scholarship, he wrote, had been little else than book learning and intellectual idolatry. It had been subservient to racial habits of mind (the "idols of the tribe"), personal prepossessions (the "idols of the cave"), tradition, especially scholastic tradition (the "idols of the theatre"), and habits incorporate in language (the "idols of the marketplace"). Nowhere had it served truth, which is discovered only by persistent and dutiful observation. Let book learning be the useless tedium of priests! Nature will be the study of men who directly draw from their observation of fact the power to control nature and man.

Later centuries have responded perhaps too readily to this Baconian exhortation to cut oneself off from past intellectual tradition, in order to extract from sheer fact a knowledge which has no presuppositions whatsoever. Admirable in its encouragement of critical and observant habit, Bacon's teaching suffers from its neglect of the continuity of man's intellectual evolution. This weakness becomes apparent in Bacon's description of science. In truth, modern science revived and widened an intellectual tradition which had been preserved for twenty-two centuries, ever since its inception in ancient Ionia; but because he was ignorant or unappreciative of this long evolution, which he knew only in its medieval decline, Bacon failed to grasp the ideal of theoretical unity, which is a source and guide of modern science no less than it was of earlier science.

using them and noting their implications and presuppositions; but only the creative scientist is qualified to reveal the "method" of science. Since this method is that of genius, it eludes definition, and can be appreciated only in its achievements. Newton is said to have reached his gravitational hypothesis by observing the fall of an apple from a tree; but what was the breadth and content of thought that could read into the fall of an apple the fall of moon to earth and of tide to moon, and pursue this analogy through mathematical labyrinths never traced before? Was that an "induction" from observed instances? In some sort, perhaps; but in what sort?

Bacon's writings, if we may accept the evidence of seventeenth-century literature, were the chief stimulus of the rather facile optimism which called itself "the Enlightenment." The spokesmen of the Enlightenment regarded all earlier time, with some reservations respecting pagan antiquity, as an age of darkness from which reason or science now at last delivered man—and delivered him completely, into perfect light. This curious obliviousness of medieval antecedents was due in part to the linguistic shift from Latin to the European vernaculars; yet Francis Bacon and Descartes, the two chief literary sources of the Enlightenment, were Latin scholars deeply indebted to medieval literature. They gave expression, we must conclude, to a real and widespread desire, current in their time, to shake off all the past and to advance in the power of certain new conceptions of nature and man to an unparalleled future. The writers of the Enlightenment were able to convince their contemporaries, and even the later centuries as well, that reason appeared on earth suddenly and without antecedents, this interesting event occurring in or about the year 1600. Thus we are told to see in Francis Bacon, who owed whatever he knew to medieval predecessors, "the father of modern science"; and Descartes is held up as "the founder of modern philosophy." Seldom has a culture drawn such a veil between itself and its

the cover to a new and revolutionary theory of nature, man, and society. What Descartes meant was nothing less than this: Applied mathematics is our sole science, its results are certain and its range unlimited, and all our other beliefs must be established upon or accommodated to this basic and certain knowledge.

Descartes, a frail lad, was educated by Jesuits in northern France. He was there impressed, he tells us, only by his mathematical studies, all other instruction seeming futile. Where Descartes learned his contempt for scholastic philosophy and his inclination to Augustinian and Calvinistic theology is an interesting question. After sampling the salon life of Paris and finding it trivial and hectic, he took refuge in the army. One cold night before a coal fire there came to him the vision of a new science and a new world. Descartes is so modest in his account of this vision that its radical implications are easily overlooked. One sees the cool and lucid rationalist, and misses the social reformer whose utopian optimism has stimulated the most violent social revolutions of the modern age. This new science, Descartes believed, would within the near future place in man's hands a power allowing him complete control over every human condition. Disease, poverty, crime, and war would be eliminated; and human society would be established upon a new and completely rational basis. Until such time as this millennium was reached, Descartes discreetly promised, he would conform to the usual moral conventions and live as other men.

Appreciate first the scientific vision of Descartes! Greek geometry had analyzed static surfaces and volumes, carved out of empty space. The new analytic geometry seemed to lay hold of the properties of motion itself. Given three straight lines at right angles and intersecting at a point, any motion can be described by reference to these three coordinates. A series of such references defines a line, or the path of a motion; and a set of such lines may be used to define any physical situation.

science, which always supplements this doctrine of absolute mobile continuity with theories presupposing a discontinuity of stuff in nature. Nor is the conception of a mobile continuum itself clear or complete. Physical theory distinguishes many types or species of motion or energy, in its accommodation of this concept of dynamic continuity to the discrete and articulate world which is presented to our senses. Descartes' conception of nature, no less than that of Plato, harbors a dualism according to which a static, universal form, eternally defined by the axioms of geometry, invests the particular motions which variously manifest this eternal form; and as with Plato, the relation between universal form and particular motion must be left wholly unintelligible. Since this dynamic concept of nature is difficult and perhaps impossible to clarify, it is usually replaced by a mechanical conception which conceives nature to be constituted wholly of some sort of clockwork, intricate and infinite. Descartes himself often slipped into this mechanical conception when presenting or applying his dynamic theory.

One great virtue of this Cartesian concept of nature is its rigorous determinism. Everything that happens, at any time and place, even in its most minute features, is held to be completely necessitated by its spatio-temporal context. There is no accident, no chance, no element of formless "matter" in nature itself. Events are accidental or due to chance only in the sense that we are ignorant of their causes and powerless to control these. Perfect knowledge would see everything in nature to be wholly necessitated, and therefore completely intelligible. This mechanistic concept of nature would seem to be the condition of a complete understanding and an absolute control of natural occurrence.

But where does man belong in this mechanistic world? He cannot, Descartes concludes, belong in it at all. The mind of man, which observes, knows, and within its powers controls material nature, must be wholly other than nature, no part

Descartes called physical nature "matter," and said that "the essence of matter is extension," meaning that the true form of physical nature is its geometrical pattern. He similarly speaks of conscious experience as "mind," and says that the "essence of mind" is thought or scientific analysis. This language is really a concession to scholastic philosophy, and a source of confusion in Descartes' philosophy; but it was nevertheless indispensable to his system. Our immediate apprehension of nature is wholly unlike that colorless, soundless, perfectly geometrical and mobile continuum which nature becomes in Descartes' science. The really physical characters of things, Descartes believed, are proper to external reality itself; but all color, taste, and other sensible character is wholly in and of the mind, being a mental confusion, due to our intellectual passivity, of the true mathematical pattern of nature. What earlier philosophy held to be accidental and unintelligible in the world, and ascribed to "matter" in distinction from "form," Descartes finds to be an illusion in the mind, where, however, it really exists as sensations, feelings, and other non-rational activities. When reason is active, all of this confused mental material is eliminated or transmuted, to leave us with a rational understanding of the real motions of nature in their purely geometrical character. There is the real physical world, composed of sheer motion; there is the real mind, constituted by a true and rational apprehension of physical motion; and then there is a sort of iridescence, produced by the confusion of physical reality and mind, but truly nothing. The power of the Cartesian philosophy lay chiefly in the simplicity and clarity of its positive teaching. This was, that mathematical science truly portrays external reality. With resoluteness it ignored, or dismissed as illusion, whatever presented difficulties to this doctrine.

Yet what a strange, stark, and really terrible doctrine it is! Man is to be identified with his reason, which finds in external reality only an infinite, colorless, silent waste of physical mo-

nature, and by virtue of its intuitive power perfectly illuminate that limited area. He thinks of scientific theory as being already completed in mathematical theory, the expansion of science being only the continued application of this theory to ever new areas of nature. He does not conceive of a development of scientific hypothesis, stimulated by widening experience and reaching new basic principles.

Modern rationalism, thus initiated by Descartes, differs importantly from the earlier rationalism established by the Greek philosophers. That earlier rationalism was a dualism of matter and form. It conceived nature to be everywhere dual, each existent thing and process being compounded of two sorts of being, namely of eternal and perfect form, and of shifting matter which is the source of imperfection and change. The Cartesian dualism of matter and mind is something very different. It conceives nature to be everywhere perfectly formed, what seems imperfect or unintelligible being truly an illusion in our minds, which are no part of nature. Yet the distinction between the particular changing detail and the universal geometrical form of nature must still be preserved, although there is now no philosophical place for it; and this seems to introduce again, but now unconsciously and disingenuously, the matter-form dualism which is explicitly rejected. Further, the Greek rationalism was genuinely idealistic. It conceived the universal form of nature to be the goal or end toward which all things strain, and in the reaching of which lies their natural good. Only for minds, according to modern rationalism, does form constitute an ideal of this sort. Nature is perfect in its absolute geometry; but imperfect man must still strain to know this form, the intuition of which is its cognitive ideal. Does this mean that nature is wholly good, that every prospect pleases and only man is vile? Or does it mean that nature is nonmoral, its values arising solely out of its utility for man? Or is nature beyond good and evil, is it a sort of absolute contentment beyond all striving? It is evident that the Cartesian dualism, in

in the method and form of modern science. Because it seemed to make the new science simple and rational; because it seemed to offer a much needed ground for intellectual and political authority; because it promised a social millennium in an "age of reason"; because it expressed the high optimism of the Renaissance and seemed to turn its back upon the past; because, paradoxically, it also brought into philosophy certain moral and religious conceptions implicit in the Puritan Reformation; because it verbally bridged the gap between scholastic theology and the new scientific outlook; and, finally, because it was presented in a prose so lucid and effective that it has remained the model of French style ever since—for these reasons, the Cartesian philosophy had enormous influence. It established a rationalistic tradition which developed and modified itself with each succeeding generation, to become a permanent factor in modern thought; and its importance and success were not, of course, without reason, being due to the undeniable rational element in modern science, which cleaves to its theoretical form and everywhere requires the accommodation of fact to the requirements of logic. We shall not be able to estimate the value of the thought of Descartes, consequently, until we have come to some conclusion concerning this relation of empirical fact to logical form. What Descartes too much neglected, we saw, was the empirical element in modern science, this being its most characteristic and important element.

Notes for Further Reading

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14 THE RATIONALISTIC PHILOSOPHY OF MODERN SCIENCE

(Continued)

ESPECIALLY ON THE CONTINENT OF EUROPE, THE thought of Descartes became the starting-point of many who wished to emancipate themselves from past tradition, and to establish life and society upon a purely rational, indisputable basis. As we have seen, the Cartesian system was by no means so complete a break with earlier thought as he and his contemporaries believed. His mathematical concept of physical nature improved upon that of Pythagoras; his dualism of physical and mental being gave philosophical room to the Christian dualism of world and spirit, the sacred and the profane; his theology was Augustinian and scholastic. But these traditional elements, which allowed Descartes to reach his readers, largely served as a bridge which could be crossed and then burned and forgotten. They constituted a sort of religious background, taking care of the inscrutable and allowing the foreground of thought to be brilliantly illuminated. By most of Descartes' readers, a method so powerful and a reason so lucid was expected to overcome every problem. Men of less genius did not see that his power was the clarity with which he perceived the limitations of his rationalistic method. Descartes

any better than we understand how physical body affects mind? To say that the motion lost by one body is only transferred to the body with which it collides allows us to describe such events in mathematical equations; but it does not explain how the transfer of motion takes place. Motion is a bodily property, and how can bodies exchange properties? The causal connection remains unexplained and inexplicable, and we must say that one physical event only occasions another, the true cause being God. The Cartesian doctrine, at first sight so lucid and rational, evaporates into religious mysticism. The French cleric Malebranche welcomed this conclusion. The physical world, he suggested, is but a myth, all our experience proceeding in God, who is the sole agent and ceaseless creator of all that is. This idealistic mysticism was later developed by Berkeley.

But two continental thinkers, Spinoza and Leibniz, made valiant attempts to modify the Cartesian system in such a way as to meet this matter-mind problem without sacrifice of the Cartesian faith in science. *Benedict Spinoza* (1632-1677) attempted a solution by means of the concept of an absolute correspondence or parallelism between physical and mental processes. To every mental condition, he supposed, there corresponds a physical condition; and vice versa. Our will to move and our bodily motion are not cause and effect, but two aspects of one and the same concrete event. Similarly, every sensation is the mental aspect of some bodily condition. The real world, in short, is everywhere at once mental and physical, just as a box must have an inside and an outside, or a curved line a convex side and a concave side. Matter and mind are not two substances; they are two most basic properties of one and the same substance.

This conception of psychophysical parallelism has proved useful, even indispensable, in human psychology; and we cannot doubt that it expresses a biological fact. Also, it suggests a more general conception which is intellectually emancipating.

man would regenerate society and establish it on a firm basis; but he nowhere rationally established even this assumption. So Spinoza wrote his *Ethics*, a treatise of rational morality and rational religion.

We possess today a considerable body of theoretical science, the authority of which is seldom seriously questioned; but after three centuries of theoretical research, we have still no authoritative science of ethics. Kant, who was the profoundest student of this problem, concluded there can be none, because freedom and authority are reciprocally exclusive. But Spinoza did not doubt the possibility of a rational ethical theory. His faith was due in part to his need, which would not be denied. He was the son of a Jewish family, driven from Spain to Holland by the persecutions of the Inquisition. In Holland, his intellectual audacity brought him into collision with orthodox Jewry, which excommunicated him from the synagogue. Spinoza needed a rational religion, one that would leave him intellectually free, yet unite him with his fellows despite all differences of confession and race. He became the first modern exponent of a liberal religion which would carry into creative faith the intellectual powers active and creative in science. He had a second ground of faith. Although Spinoza subscribed to the Cartesian science, he was not only nor even primarily a Cartesian. In his youth he had steeped himself in Jewish and other scholastic theology, and he never renounced certain large tenets of scholastic doctrine. The Puritan conception which allows to nature no intrinsic value, but sees in it only a physical mechanism created to serve man's moral purpose, never found lodgment in the mind of Spinoza. Nature was for him what it was for the Stoics, the material expression of universal and divine Being. Both metaphysically and morally, Spinoza is a modern Stoic, one who adapts the Stoic concept of nature to the supposed requirements of modern science. The main outline of his metaphysics is as follows: There is but one Substance, infinite in extent and variety, but absolute in its unity.

pendent substance, in some degree effecting its own mental processes, and therewith its physical processes. And in fact, Spinoza assumes much more than this bare choice. To choose the rational life, he says, is to resist the passions, temptations, and feelings induced in us by our immediate environment, which compel us to pursue pleasure, fame, position, wealth, and other "worldly" goods. To live rationally is to live wholly in and for an "intellectual love of God," *i.e.* a rational understanding of ourselves as mere items in the universal Substance. Spinoza implies that the individual is free to determine his life, and that he will find his true good in an intelligent and voluntary participation in a universal divine Process.

We may accept the ethical purpose of Spinoza, which was to establish a rational and intelligent moral science, without being disturbed by the metaphysical inconsistencies of his ethical theory. In the same way we may accept his call to an independent and intelligent religious faith without identifying ourselves with his specific conclusions, which were determined by his faulty interpretation of science. Spinoza was adamantly opposed to all revealed religion, with its appeal to past authority, its dogmatic persecution of heresies, and its anthropomorphism. The only true God, he taught, is that eternal, immutable, universal Substance, which, wholly unlike our human selves, is omnipotent and infinite, yet accessible to our rational intuition. Spinoza's criticism of biblical sources initiated a new era of critical and scientific religious study, and was the important forerunner of the critical historical science of today. He widened the religious outlook of his age; and his work should have initiated a creative movement, reaching new religious truth by applying to religion the faculties developed by a free and observant science. His achievement remains great, therefore, after we discount his ethical and religious teaching as too rationalistic and intellectual, too solitary and aloof, too unrelated to emotional and social actualities.

The chief philosophical influence of Spinoza, over and above

The fact was that philosophers had now to reconcile, and if possible to synthesize, two important but quite different intellectual traditions, developing quite distinct concepts of nature and knowledge. One was the Greek and medieval tradition, which drew, so to speak, a horizontal line through nature, dividing every natural thing into a more lowly matter striving upwards toward its true form, and a transcendental form condescending to this lowly matter. The other tradition was this newer Cartesian conception, which drew a vertical line dividing physical reality off from another reality called "mind." Since this physical reality was also usually called "matter," it was mistakenly given many of the properties of the Greek matter; and this led to all sorts of confusion and ambiguity. No one tried more brilliantly, or more desperately, to make sense of this confusion of Greek and Cartesian metaphysics than the German philosopher Leibniz.

Gottfried Wilhelm Leibniz (1646–1716) was, like Descartes, a mathematical genius; and, again like Descartes, he wished to conceive of nature in such a way as to make it wholly conformable to mathematical theory. Descartes, the inventor of analytical geometry, had conceived nature to be wholly fluid and continuous, to be just geometrical motion. Leibniz was the inventor of the infinitesimal calculus, a rather paradoxical theory which requires us to conceive of any finite quantity as being composed of an infinite number of infinitesimally small quantities. The application of this theory requires a conception of nature just the opposite of that of Descartes. Descartes had to suppose that every apparently solid and discrete body is really mobile, fluid, and continuous with its context, its apparent solidity and fixity being due to the constant pattern of its motion. Leibniz, on the contrary, had to conceive every apparent continuity in nature, *e.g.* a line, or path of motion, to be made up of those discrete infinitesimals which compose, when there are infinitely enough of them, finite and visible things.

It was Descartes who first taught, in modern times, that our ordinary experience is only a confused version of our clear rational intuition of true being. Spinoza, thereupon, supposed that animals and other subhuman beings are possessed of an even lower and more confused mentality. Leibniz similarly supposes that the extended physical world arises from our confused vision of myriads of nonextended monads which to a perfect vision would be separately and individually known. But the uniformity or natural law which characterizes this extended and illusory physical world is not altogether an illusion. It represents the true character of the constituent monads, which were created by God in such manner as to exhibit, when confusedly seen, these real uniformities instituted by God.

The monads, Leibniz taught, are purely spiritual, indestructible, self-determinate beings. Each monad, from the beginning to the end of time, exhibits only its own successive states, in the order determined by God at its creation. You and I are such monads, temporarily attached to myriad other monads constituting our bodies. Our experience did not begin with our birth, it began with the creation; and it will continue, after death has dissolved our bodies, to the end of time. Since each monad is wholly self-determined, there is no real interaction anywhere. When you see me, I am really here; but your perception of me is not due to my presence, it was instituted in you, and ordained to appear at this time, by God at the creation; and it was then also ordained that I should really be here at the time you see me, so that your perception, although wholly subjective, is nevertheless objectively true. Leibniz is an Occasionalist in this denial of real causation in nature; but it is to the original creation, and not to the present intermediation of God, that he looks for the explanation of all apparent causation.

This doctrine gets impossibly involved. First, we must suppose that a monad really sees other monads, but sees them only confusedly as extended objects, much as separate points are

an organic whole "ideally" controlled by the Supreme Monad which is God. Presumably this Monad, which ideally controls all other monads, is another Person than that which actually created all monads whatsoever, including Himself.

The curious, intricate, elusive, and ultimately unthinkable system of Leibniz was the work of a man whose mathematical genius took him into a game with manipulable symbols. These can be thrown at will into all sorts of symbolic patterns; and the problem is then to give to the symbols descriptive meanings. The relationship of these patterns to observable fact may be remote or nonexistent; yet they can be defined with mathematical precision. Leibniz is the *reductio ad absurdum* of the rationalistic dogma, revived by Descartes, that the clarity and distinctness of ideas, i.e. their logical manipulability, is their truth. Yet Leibniz applied this faculty of free mathematical invention to very real problems, for example to the problem of freedom in a physically necessitated world, and to the problem—if it be another and not the same problem—of the relation of particular fact to general hypothesis. His conclusion was that freedom and individuality or particularity are real and ultimate, but that natural law and generality are also real in a certain sense, because God so created free individuals that they would seem to behave according to general principles. This conclusion probably amounts to the admission that freedom and individuality are not to be intelligibly reconciled with the concept of natural necessity, but must be affirmed by an act of religious faith.

Leibniz was the greatest logician since Aristotle and prior to Bertrand Russell; and he was the originator of the movement which led to modern logic. His fertile logical imagination generated several ideas which have had profitable applications in science. One of these, already mentioned, was his idea of organic relationship. Another was his notion that space and time, at least in their mathematical formulations, are relational orders of things and not the absolute media which Newton

sized mathematical principles, their different mathematical systems pointing to very opposite concepts of "reality." Spinoza, less bound by physical science, cultivated a "rational intuition" which apparently, if we may judge by its very different results in different thinkers, allows one to intuit any sort of "absolute reality" one happens to prefer. It is clear, perhaps, that this rationalistic philosophy is cognitively irresponsible. We know today that mathematical theories can be made to order, in such a way as to define any sort of material we may imagine; and this means that mathematical theory, in and by itself, is no indication of the sort of world we actually inhabit. But a free "rational intuition" of Spinoza's sort is even more irresponsible. It does not even conform to strict logic, as does mathematical theory.

Notice, once more, how this modern rationalism differs from the Greek and medieval rationalism! Plato also supposed that true knowledge arises from self-evident principles given to the reason, and that these rational principles define the eternal and universal structure which is discovered by science in the world. But the Greek rationalism did not identify this "reality" with existent nature, as does modern rationalism. It identified "reality" with the form of nature; but it also postulated a material element which is the source of accident, defect, and particularity in nature. Modern rationalism renounces this dualism of form and matter—it takes existent reality to be pure form, and holds that what is not pure form arises as a subjective illusion, due to confusion in the mind.

It is evident that this rationalistic doctrine assumes, but without admitting it, the cooperation of the senses in natural knowledge. Knowledge of universal principles would tell us nothing about *this* world, which is a consensus of particular fact. Only the senses can reveal the particular configuration of nature at any place and time. Geometry could not tell us that there exists a sun with just so many planets, or that Jupiter has four moons, or that you were born and now exist. Leibniz was aware of this

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empirical in its establishment of universal principles such as that of gravitation, which had to be reached by observation and experimental hypothesis. It is not self-evident that bodies must attract each other according to just this formula. Reason alone, it follows, does not tell us what sort of a world this is. The nature of nature awaits discovery. Science must continually construct new hypotheses, and retain these only so long as they meet the observable facts.

The principles of rationalistic philosophy can be stated fairly simply. The principles of empiricism are more difficult to expound, because their final implications are obscure and perhaps inexhaustible. How, for example, shall we explain the fact that theoretical science, although it willingly subjects its special hypotheses to factual confirmation or disproof, still assumes that *some* general theory must meet all of the facts? Empirical science still seems to rely upon the self-evident principles of logic, assuring the success of theoretical analysis. The early nominalists, who were the forerunners of empirical philosophy, too easily disposed of this difficulty. Reality is made up of individual and unique things, they said; and theories are merely verbal or mental constructions. We will find that this is by no means the whole truth. Scientific theories are indeed composed of words or ideas in our minds; but if we are to distinguish between a true theory and a false theory, we must suppose that the true theory indicates, and the false theory fails to indicate, a real pattern in the real world, and not merely a pattern in our minds.

Francis Bacon, who instructed his readers to look only to nature for their knowledge, inclined to this nominalistic view; but he cannot be said to have presented an intelligible theory of knowledge. *Thomas Hobbes* (1588-1679), whose political philosophy we have already noticed, served Bacon as a sort of secretary in the old minister's declining years. Hobbes explicitly subscribed to nominalism in his analysis of cognition; but his materialistic philosophy implies a rationalistic theory of knowl-

him to avoid the difficulties of the Cartesian dualism and to understand mental processes as manifestations of causal interaction proceeding between the human organism and its natural environment. Mental process, Hobbes supposed, is only physical process of a special and complicated sort. Psychology ought therefore to pattern itself upon physics. Just as physical science divides into geometry and mechanics—the first defining the static structure of matter and the second describing the interactive processes of matter—so psychology will divide itself into two studies, one discovering the permanent principles of human behavior and the other describing the temporal processes of human life. This may sound very empirical and scientific, but its analogy between physical dynamics and a psychology of human purpose betrays an irremediable confusion of mind. This confusion becomes apparent when Hobbes identifies the two divisions of psychology respectively with ethics and politics. Hobbes here confused an empirical psychology, which would seek a general statement of how men do in fact behave, with a normative moral code prescribing how men should behave. Hobbes was betrayed by his unconscious rationalism. Because he believed that there are absolute mechanical principles to which everything must of necessity conform, he could conclude that there are absolute rational principles to which all human beings must of necessity conform; and so he inevitably came to confuse moral principles, which tell us how man ought to behave, with scientific axioms telling us how men must behave. Ever since Hobbes, materialism with its confusion of moral and descriptive principles has hindered the scientific study of man and society, and endangered freedom.

Hobbes did not know, we conclude, what constitutes empirical science, in spite of the fact that his fresh and often discerning study of man helped to inaugurate an empirical psychology and sociology. Yet when he turned to a direct study of human knowledge, he committed himself very definitely to the principle, out of which issues finally a true empirical

prepossession, are pseudoconcepts, or meaningless words of this sort.

Hobbes' materialism and the political absolutism which derived from his materialistic principles seem to have exerted considerable influence on the continent of Europe. In Britain his materialistic rationalism and his political absolutism found little response. This was not the case with his psychology and his nominalistic theory of knowledge, which had important consequences. These studies revived the critical attitude of the medieval nominalists who had opposed the scholastic rationalism; and they initiated modern *critical philosophy*, which undertakes a critical analysis, and reaches a very cautious estimate, of the validity and scope of theoretical knowledge. Chiefly through Hobbes there came to be developed that subjectivistic and introspective sort of psychology which studies mental contents in isolation from their physiological and external conditions. Recent psychology has largely freed itself from this subjectivistic and sterile tradition. In philosophy, however, Hobbes' subjectivistic analysis of mind has continued to characterize an introspective "epistemology," which narrows and defeats philosophical speculation. But Hobbes, in spite of his faulty psychology and his absolutistic premises, was nevertheless an important channel through which the critical philosophy of the later Middle Ages came down the centuries to ourselves.

This critical philosophy was primarily directed against rationalist tradition. Its positive purpose, however, was the defense of an empirical science basing its conclusions wholly upon observable fact. *John Locke* (1632-1704) is generally and with reason regarded as the chief founder of modern empirical philosophy. We have already noticed Locke's political theory, which still provides the theoretical basis of modern democratic government. We should see in Locke's general philosophy, published in 1691 in the famous *Essay Concerning*

conformity to some known and supposedly indubitable principle the test of the truth of a new hypothesis. Locke is excusably vague, and sometimes mistaken, concerning just how new truth is obtained.

His *Essay* opens with a critique of dogmatism and rationalism. In his political writings he had attacked the concept of divine monarchical right, because this was the most powerful and widespread of the dogmas which prevented individual assumption of the responsibility of self-government. He now attacks all dogma, and indicts the dogmatic habit of mind itself. There are, he says, no "innate ideas." He means that there are no principles which are innate to the mind, prior to experience, or which need no confirmation by experience. All ideas and all knowledge derive from experience, our surest ideas being those which experience most widely confirms. What rationalistic science takes to be infallible and self-evident principles, he says, are in fact only *nominal definitions*, prescribing certain fixities of meaning and conventional use. They do not amount to *real definitions*, defining once and for all the ultimate natures of things. Such real definition, Locke implies, is beyond our powers. Our knowledge of things is partial, tentative, progressive, never final nor definitive. Locke was a lifelong student of science; he practiced medicine, cultivated the friendship of leading scientists, and kept abreast of scientific invention. He did not confine himself to an appreciation of mathematical physics. He conceived science to be discovery—not a set of theoretical principles, but the inexhaustible generator of theories and principles.

Negative in its denial of self-evident truth, positive in its affirmation of the creative and exploratory power of science, Locke's view is negative again in its denial of universal knowledge, *i.e.* knowledge of the universe in its totality. He was driven to his study of cognition, he writes, by his perception of the fruitlessness of current metaphysical discussions, in which philosophers threw at one another different conceptions

sensory evidence and theoretical hypothesis; but in fact he denied it, by relegating all that is not rationally formulated to a limbo of sense-illusion. The distinction between what is perceived and what is conceived lies within science itself. Science includes both clear and explicit theory and the inchoate evidence which is organized by means of theory. We owe to the empirical philosophers the insight that science is the concrete but intelligent apprehension of particular fact, *i.e.* of nature itself as it observably exists. What the empiricists failed to make clear was the relation between these two elements, the formulated theory and the particular observable facts. Somehow the particularized evidence at once distinguishes itself from the general theory, and supports the general theory. But how?

Locke took refuge in the oversimple distinction between primary and secondary qualities, in order to explain the scientist's transmutation of sensed particular fact into scientific knowledge. Nature, he assumed, is a collection of real things or substances, each of which has its real and intrinsic properties. Some of these properties enter into experience unchanged; and in regard to these, our perception is truthful and scientific. But many of the characters of perception are not truthful. They are the effects in us of the actual properties of the thing; and these effects may little resemble their external causes. Locke's suggestion is that science should discover the true natures of things by discerning and reflecting upon the primary properties. (This suggestion is revived in a corrected form in the "critical realism" of today. But Locke's main conception, which states knowledge to arise as the result of a process of comparison, abstraction, and recombination effected upon the materials of sensation, points in a very different direction, leading to modern idealism.) Locke does not, as a matter of fact, provide a single consistent description of cognitive process. Sometimes he is a realist, and holds knowledge to be at least in some degree identical with the substances which it describes;

insisting that truth is the correspondence of idea with fact, he seems to be saying that knowledge is a perception of agreement or disagreement among ideas. Only very cursorily does he now discuss "the agreement of ideas with real existence." These later chapters might have been written by a rationalistic follower of Descartes. Yet Locke may not have meant to say that the axioms of mathematics and the generative principles of morality are innate and self-evident truths, established by pure reason. In attributing absoluteness or certainty to these axioms and principles, he may have meant only that they are the widest, most certain, and best attested deliverances of experience, confirmed by all observation. In spite of many requests that he should do so, it might be added, Locke was never able to present the set of principles basic to a "moral science" paralleling mathematics. He felt, perhaps, that these absolute moral principles were implicit in his political theory. If so, they would comprise an affirmation of the moral, self-responsible, and essentially virtuous character of individual man.

Locke's limitations were also his strength. He was a man of incomparable "common sense," able to state philosophical convictions in language intelligible and convincing to the reader untrained in philosophy. At the same time, he had an intellectual shrewdness and a superlative honesty which led him to the heart of a problem, and which usually saved him, much as he wished to save others, from losing his feet among words and ideas. His intellectual modesty, moreover, relieved him from the necessity of elaborating a completed philosophy, meeting and resolving all of the problems which he himself raised. Locke did not see these problems as clearly as Hume and Kant would later see them. He conceived of the pursuit of knowledge as a campaign which is to be tactically advanced on many fronts, and which neither requires nor allows a global strategy. He did not believe, we noted, in the possibility of a universal, comprehensive study of fact. Yet his very limitations allowed him to establish, more securely than his predecessors had done,

be removed, it had to be elaborated into a system making clear its whole implication. This was done by George Berkeley, writing not long after the publication of the *Essay*.

George Berkeley (1683-1753), a student preparing for the ministry at Dublin University, was one of those who were entranced by this "new way of ideas." If knowledge is wholly derived from mental impressions or ideas, young Berkeley pondered, how can the knowledge thus obtained discover to us anything peculiarly nonmental, material, and inert? In a brilliant psychological study, Berkeley showed that many of the experienced characters which we unhesitatingly ascribe to material nature are really the action or effect of sensory activities proceeding in the organism. Everything that is directly perceived, he concluded, is conditioned by the nature of the percipient organism, *i.e.* by our own nature. Berkeley realized that this conclusion was pregnant with philosophical consequences; and very soon, while still in his twenty-second year, he published *The Principles of Human Knowledge*, destined to become another of the classical texts of modern philosophy. His thesis is that of *idealism*. A reality that is perceived and known by mind, he argues, must itself be of a mental character, related to that which apprehends it. If reality were completely nonmental, wholly unlike and unrelated to our minds, there could be no real connection between nature and mind, and knowledge would be impossible.

The conscious human organism or mind, Berkeley concludes, enters as a factor into every sense-perception; and if perception is the material source of truth, this mental character will consequently qualify all that we know. The world that we know, he continues, is constitutively determined in all of its character by the fact that it is perceived, *i.e.* by its relation to the perceiving mind. We may not therefore accept a science which ostensibly defines nature, but which does not acknowledge this mental character qualifying all our immediate experience of nature. If the mental character of "being-perceived"

Berkeley establishes his conclusion that all reality is mental? He used his mentalism, indeed, to discredit the materialistic doctrine which teaches that external reality is really composed of unconscious material atoms, moving according to the laws of mechanics. This mechanistic science may explain how physical things interact with and upon each other; but it does not yet explain how things act upon our minded selves, producing mental effects in conscious organisms. The causal connection, Berkeley might have said, presupposes some deep sort of continuity, likeness, or even identity between what is cause and what is effect, *i.e.* between the external world and its effects in conscious perception.

It should be recognized that this idealistic argument is still possessed of force. That there is causal interaction between the living organism and its external environment most of us will readily admit; but we do not always admit that the existence of this causal process requires us to explain the external world in terms of its interaction with animals and men, as well as in terms of its inorganic interactions. The cognitive response of man to nature implies something with respect to nature. We must also explain the living organism in terms of its interactions with the external world; and this duly leads us to a biochemistry and even a psychophysics; but this latter implication Berkeley did not or would not see. His purpose was to make a frontal attack upon materialism of the Hobbesian sort, which, when taken alone, he quite properly saw, invalidates all moral, religious, and intellectual truth, fails to explain our immediate perception of natural quality, and finally makes unintelligible the distinction between living and nonliving things. Both materialism and idealism, we may conclude, are partial truths. The materialist wishes to recognize only such causal relations as connect inorganic substances, ignoring the relations between conscious organisms and their environment; the idealist, on the contrary, recognizes only this latter sort of relation, and neglects the causal processes discovered in inor-

called "universal form"—is apprehended by the intellect or reason. The medieval mysticism which sought an immediate, even a sensory, apprehension of divine and ultimate Being consequently involved a new evaluation and a rehabilitation of particular fact, which Greek science and philosophy had belittled and neglected. Both assumptions—that we know particular character only through the senses and general character only through the intellect—may be mistaken. The writer believes them to be so. But they are still widely and unhesitatingly affirmed; and they help to reveal to us certain aesthetic, moral, and religious motives which have advanced the development of empirical science and philosophy in the modern age.

Many of Berkeley's subsidiary arguments, applying or supporting his idealistic thesis, are acute and have been confirmed by later thought. For example, he rejects the distinction, at least as it was then made, between primary and secondary qualities. We cannot separate out of our experience, he points out, certain perceived characters which persist unchanged by our perception of them, to leave aside those which are transformed by the process of perception. Every perceived character whatsoever, he shows, is subjectively conditioned—size and shape just as much as color or warmth. In the sense of being subjectively conditioned, therefore, all perceived characters are secondary; and it is further clear that all of those characters which had been elevated as primary and absolutely truthful, such as size and shape, are known to us only by way of the so-called secondary characters. A world without color, without light and shade, and without tactile quality would present no sensible sizes or shapes, but would fuse into inarticulate unity. Berkeley, however, would call all qualities primary, rather than secondary, because he holds that in spite of their being conditioned by the percipient organism, they are the real and ultimate qualities of the world. Today, the cogency of Berkeley's criticism of primary qualities is fairly generally conceded. All perceived characters, it is usually allowed, are

rialism; and if we are to allow that idealism is an intelligible doctrine, we must allow realistic truth to concepts and renounce the nominalistic position.

We have now seen several sorts of idealism, and it is important to distinguish them. First, we met *Greek idealism*, which did not deny but emphatically affirmed the reality of matter of a certain sort. Greek idealism was dualistic, it explained each existent thing as a compound of matter and form. It was idealistic in the sense that it attributed to the forms which invest things a high or "ideal" beauty, a supreme rightness and significance—not that it conceived things, or even forms, to be peculiarly mental or immaterial in the modern sense. *Modern idealism*, unlike the Greek, is monistic; it denies the reality of matter, and attributes reality only to mind. Modern idealism has two forms. Rationalistic or Leibnizian idealism defines the mind in terms of its intellectual processes and its conceptual knowledge; and it consequently conceives reality to be some totality of intellectual process. Perceptual or Berkeleian idealism defines the mind as a panorama of sensory experience; and it consequently conceives the universe to be a larger expanse of such experience. Both conceptions are difficult, vague, and ultimately unthinkable. Their value is to remind us that the conscious intellectual and perceptual processes of man really exist. These processes cannot be argued out of court; and they make unacceptable any conception of nature which leaves them inexplicable or unaccounted for. Man, and all that he is, is part of nature, and a clue to nature. But simply to define nature as a larger replica of psychological process seems rather futile, not to say puerile. Plato, whatever his inadequacies, was more mature in his perception of the problem and in his dualistic solution of it.

We noticed that Berkeley's idealistic metaphysics, with its acknowledgment of a "notion" of mind and universal being, required a departure from his nominalistic theory of knowledge. An early *Common-Place Book* in which the young

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as a pioneer of psychological and social science that Hume is chiefly remembered and most assured of immortality. He is remembered as the destroyer of that rationalistic tradition, which ever since the time of Parmenides, Plato, and Aristotle had wet-nursed the human intellect. It was a tradition which still constrained thought when Hume wrote, and which even today from certain strongholds seeks to assert its dominion. But because of Hume the iconoclast, a dogmatic rationalism can scarcely reign again. So soon as it asserts itself openly, it is met by the stern gaze and the unanswerable question of Hume, and it retires defeated. This is not to say that Hume rid us completely of dogmatism—there is still plenty of that in the world; but dogmatism exists henceforth by inadvertence, in disguise, or armed with brutal force.

Dissatisfied with life as a shipping clerk, David Hume took his small competence to La Flèche, the little French town where Descartes had been educated; and there, after three years, still a young man in his middle twenties, he completed his first and greatest work, the *Treatise on Human Nature*. Note its title, and also its subtitle, which reads: *an Attempt to introduce the Experimental Method of Reasoning into Moral Subjects*. We would not regard this book, today, as being primarily a study of human nature; we would discover in it no experiments; and we would say that only its less important chapters treat of morals. Its more important parts treat of causal relationship, a concept basic to every study of nature. By the "experimental method of reasoning" Hume meant, if we may judge him by his work, a science not committed to rationalistic prepossessions; and under "Moral Subjects" he included the whole range of human activity.

There is no doubt that Hume's initial purpose was to extend to the field of human behavior the sort of analysis so magnificently applied by Newton to the field of physical nature. Newton seemed to have shown that all material change is explicable in terms of atomic particles, interacting according

thinks of knowledge as a pattern of ideas which is centered in a perceptual nucleus actually present, but supplemented by ideas recalled from memory. His purpose is to show how such recall occurs, and what sorts of conceptual knowledge it generates.

It seems clear that we do call to mind from memory those ideas which are *similar* to the ideas now present to us. Our most basic and initial thought process is recognition, whereby present perception is supplemented by memory, *i.e.* by recalled earlier perception. Evidently there is among ideas this relation or associative bond of similarity, over and above the association of contiguity described above. Ideas are associated, Hume says, by contiguity and by resemblance. Thus an idea present in perception may call to mind a similar idea, earlier perceived; and this earlier idea may bring along with it other ideas, contiguous with it in the earlier perception. You see Brown, you recognize him because your present perception is associated by resemblance with your earlier perceptions of him, and you are now reminded of Brown's dog which has usually accompanied him.

This is the simple sort of analysis, known as associational psychology, by means of which Hume proposed to explain every mental process, and to develop the empirical doctrine which states that knowledge comes wholly from experience. It is generally considered today, among psychologists, to be faulty in its introspective method and inadequate in its constitutive hypothesis, although the facts of recall, which Hume explained as the result of "associations," are evident enough. Contemporary empirical psychology either avoids introspection altogether, or supplements it by a behavioristic study which places mental processes in the context of their bodily conditions and the external environment. Although Hume's analysis undoubtedly assisted the progress of psychological science, it did this by elaborating an introspective psychology which finally made apparent its limitations and its nonempirical character.

psychological terms, became something else than psychology. The name "epistemology" has been used to designate this type of study, which seeks to understand the relations which hold between conceptual knowledge, immediate perception, and their objects. The chief philosophical value of Hume's psychological analysis lay in its concept of association, which allowed him to appreciate certain important relations among ideas—or among things—which had hitherto been neglected.

The concept of association of ideas, like most of the other concepts of Hume's psychology, came to him from Hobbes and Locke. Both of those thinkers had defined knowledge to be the result of a correct apprehension of relations among ideas. They had characterized true knowledge as a perception of relations intrinsic and proper to ideas, and indicated that error arises from the chance or contingent association of ideas in the mind. Thus the idea of triangle, they taught, is intrinsically and intuitively related to the ideas of three intersecting straight lines, of three enclosed angles, etc., and one cannot entertain the first idea without the others. However, one may associate the idea of triangle with a musical instrument of that shape, or with sandwiches which are often triangularly cut; and such associations are due merely to personal experience, and reveal nothing of the constitutive nature of triangles, musical instruments, or sandwiches. Hume's predecessors did not perceive—as some of his successors have not perceived—that in justifying the first sort of relationship as real and in defining the second sort, the associations, as the source of error, they were reestablishing philosophical rationalism, in spite of their philosophical conviction that knowledge comes only from experience. It was Hume's genius to perceive the significance for our knowledge of nature of these chance or contingent associations. He had the intellectual audacity to make these associations, and not the "rational intuition" of "intrinsic and necessary relations," the source and substance of natural knowledge. The whole of our natural knowledge, he taught, is only

describes things less and less in terms of their visible appearances, and more and more by inference from their causal actions and reactions. But what is causal action? Rationalism had consistently confused the concept of causation with the concept of substance, by supposing that the action of a thing is wholly due to the substantial nature of that thing. Rational insight into substances was accordingly supposed to carry with it a rational insight into causal necessities within nature. Hume perceived that in the new science, causal connection meant particular interaction among particular things, although the same *sort* of causal connection may recur again and again. What can we mean, he asks, by causal connection? Can we discover any necessary connection, *i.e.* any rationally intuited relation, between a cause and its effect? He finds none; but he has a very simple explanation of causal connection in terms of associations. When *A* has been followed sufficiently often by *B*, he says, the appearance of *A* will induce in us the expectation of *B*. The reason for this expectation is that *A* and *B*, having occurred often contiguously, are now firmly associated by contiguity. The reoccurrence of *A* arouses past memories of *A*, and these bring with them associated ideas of *B*, which we now expect to be realized again in perception along with *A*. The character of causal necessity which we impute to nature is really, it follows, a subjective character, resident in ourselves. The same sequence, repeated again and again, generates in us a habit of expectancy, such that the reoccurrence of *A* suggests the reoccurrence of *B*. Thus we come to believe that *A* necessitates *B*, independently of ourselves; and we proceed to a belief in universal natural necessity. Actually, however, we neither perceive nor understand any such necessity. So far as we know, *A* may recur without *B*, *B* may recur without *A*, *AB* may never occur again. We try to establish our faith in specific causal necessities by appealing to a universal principle of necessity, which states that every event must have its cause; but this is arguing in a circle, because we have no

we cannot reduce this relation between cause and effect to some intuitively known and rationally understood relation, but must accept it empirically and as we find it, then it follows that natural knowledge can do no more, in the last resort, than summarize observable fact.

What are the consequences of Hume's conclusions concerning natural knowledge? There are two sorts of consequence, respectively critical and constructive. The critical or destructive consequences are the surer and the more important. They might be summed up as a recognition of the contingency of nature. To acknowledge the contingency of nature means that we acknowledge the impossibility of deducing the content or character of nature from anything we know prior to our observation of nature. We must discover nature by observation and by study of observable fact, and we may not impose upon nature our preconception of what nature should be or must be. Since what we observe is always some particular situation, natural knowledge will consist of generalizations which summarize particular facts. And since our experience of particular fact is of necessity limited to what we or others have actually observed, our generalizations must be asserted modestly, and not exaggerated into definitions of "absolute reality." All natural knowledge is probable knowledge. Its probability may be very high, practically equivalent to certainty and theoretically close to certainty; but it cannot reach absolute certainty. For example, all human experience supports the belief that the earth will continue to turn on its axis, and that the sun will again rise tomorrow in the east. But we have no proof that the earth must continue so to turn; or if we could deduce this rotation from some general mechanical principle, then this principle in its turn would be indemonstrable and only empirical. Our widest, surest, and most basic knowledge of nature is still only a generalization from observed particular facts, and rests upon empirical evidence, *i.e.* upon observation. Even the most basic principles of natural science are of this sort; and

dicted and which had to be discovered by observation. Yet it is a very general and perhaps "universal" principle, and not itself a particular fact. All the principles of natural knowledge, Hume is saying, are of this sort. The whole of science, including its largest principles, is obtained from experience; and it is subject, therefore, to change, modification, and growth.

But what of the mathematical principles still incorporated in the Newtonian science? Are they not still rational, necessary, and universally applicable? Hume could not show that they are not; and it is evident that they embarrassed him, because they seemed to preserve a rational element in natural knowledge which he could not argue away. He dealt with the difficulty in two ways. Sometimes he showed that the basic concepts of mathematics arise, just like any other concepts, as the result of associations among ideas; and this would imply that mathematical theory is no more absolute than other theory, *e.g.* physical theory. At other times, he frankly recognizes that mathematical science arises from absolute rational axioms; but he assumes now that its principles do not apply perfectly to observable fact, which is consequently still free to be what it will. Hume's honesty appears in this equivocal treatment of mathematics; for we know today that both of his two views, contradictory though they seem, are correct. A science like geometry includes two elements: an empirical element which is really descriptive but only probable, and a rational element which is certain, but not necessarily descriptive of anything in nature.

Hume's general conclusion was, then, that authentic knowledge must be identified with a natural science reaching generalizations possessed of greater or lesser probability, and that principles which are supposedly possessed of intuitive certainty are on that very account suspect, and to be denied descriptive truth. This conclusion invalidated—with some reservation as regards mathematics—all so-called rational knowledge. Most emphatically it excluded all rationalistic

should be remembered that Hume's critical work is not prejudiced by the failure of Humian epistemology. It is the scientist, not the philosopher, who establishes the concepts of science.

Hume's statement of his conclusions was unnecessarily subjectivistic and skeptical. He was satisfied to say that causal knowledge, and therewith all natural knowledge, consists of habits of expectancy induced in us by past experience; and he did not further inquire—being prevented by his subjective psychological approach—into the implications of this statement. The statement implies, surely, that mental habits are effects of the more constant configurations of nature, continuously effective upon us in perception. The relation of knowledge to nature is at least that of effect to cause. This conclusion meets a difficulty which Kant was to exploit, since it conceives of a nature lying outside of experience, causing experience—and how, if all knowledge is derived from experience, should we know a nature which lies beyond experience? In the writer's opinion, the problem is apparent rather than real. The empirical doctrine states that knowledge is derived from experience; but it does not exclude the realistic hypothesis that experience is the direct effect of a reality lying beyond the mind, and that experience consequently provides clues to the character of that reality. This hypothesis is a legitimate one, and one that is confirmed by all experience and analysis.

Hume's central thesis, that knowledge is the sum of mental habits induced by past impressions, is so broad and simple that it would cover animal as well as human psychology. This was its great value. It indicated certain characters of knowledge so general and so obvious that they had escaped attention. But it is also clear that Hume, in establishing the empirical basis of knowledge in observable fact, neglected the rationalistic elements which distinguish science from ordinary knowledge and animal habit. Mathematical reasoning and other sorts of reasoning which Hume would have called "metaphysical" have a most important auxiliary function in science. This much

his lifetime, might be defended today as only a proper demand for intellectual independence in the pursuit of religious truth. With regard to revealed religion, Hume rejected miracles, along with whatever else cannot be brought into conformity with observable fact. But Hume's attitude toward religion is that of the honest inquirer, not that of the atheist. He opened the way to an independent and creative study of religious fact; and it is most to be regretted that the later centuries, which have turned Hume's empiricism to good use in every other field, have tended to place religion outside of the intellectual pale, either as a truth too sacrosanct for impartial study and creative hypothesis, or as an error better left alone. It is a pusillanimous and ignoble compromise, ultimately destructive of science and religion both, which has left to each of these two faiths one half of the mind and a peculiar social domain.

Of next importance in Hume's work, after his establishment of empirical science and method, was his application of this method to human and social fact. Hume did not follow Locke, who believed moral principles to be fixed and universal. He taught that moral knowledge too is derived from experience. But like many thinkers then and since, Hume did not sufficiently distinguish a psychological analysis of feelings, affections, and emotions, as motives of human behavior, from moral theory. "Reason is and ought to be," he wrote, "the slave of the passions." In this revolutionary rejection of all earlier teaching, Hume attacked the divorce of "moral reason" from the emotional life of man. He recognized quite properly the dependence of action upon feeling, and the instrumental function of thought in analyzing and guiding our emotional responses. But in his moral theory as elsewhere, he did less than justice to the rational element in man. The source of all moral distinctions and preferences, he taught, is ultimately the experience and anticipation of pleasure and pain, these qualities attending all our states or "ideas." Hume applied this hedonistic

Hume had given more attention to this transition from "natural" morality to "artificial" justice, and begun his ethical study with a consideration of government, he would have importantly amplified both his ethical and his political theory. But when he proceeds to his study of politics, he is once more the student of the natural growth of social institutions, intent upon showing how the natural impulses, widened by sympathy and strengthened by education, suffice to explain the long development of legal and political institutions. He regards the concept of a social contract, by means of which Locke had established government upon the natural and inalienable rights of the individual, as a convenient but rationalistic fiction symbolizing the long development of organized society out of men's natural needs and dispositions. He does not seek the principles which had implicitly determined this development. Hume left ethics in a confusion which can be removed only by an analysis superior to any attempted in the past.

Thus there is a positive and a negative side to Hume; and we should see both sides clearly and estimate them objectively. The positive side is his empiricism and his naturalism. His empiricism brought science back to its proper and necessary starting-point, which is observable particular fact, and cut down everything which might obstruct science by separating the scientist from observable facts. What most obstructed science was the retention, as absolute rational principles, of "metaphysical" concepts which were after all only the largest or most firmly established principles of Greek and medieval science. The Newtonian science had already broken away in some respects from these principles; and Hume, perceiving this, saw further that no scientific principle should or could be allowed such absolute authority. He quite properly concluded that all scientific principles which describe nature are but large generalizations from observed particular fact. In his application of this empirical theory of knowledge Hume becomes a naturalist, which is to say that he finds in nature

worthily advancing an empirical rationalism, others desperately relinquishing the empirical insight of Hume and returning to rationalism; but Hume's doctrines, too uncritically and literally taken, have sometimes produced a sort of scientific obscurantism which only inverts the "fundamentalism" of the religious dogmatist. The earlier rationalism had its most popular expression in the concept of natural law. There are certain absolute principles, said the rationalistic philosopher, which must of necessity be applied in all scientific study, such application constituting science. There are certain absolute laws, said the popular version of this view, which all natural things must obey, as a result of their inclusion in the cosmos. Hume's devastating criticism of rationalism has finally destroyed this faith in natural law; and there is no doubt that the old concept of natural law, which conceived material things to be necessitated by such laws as that of gravitation, must be replaced by the insight that material things do in fact, but not by any observable necessity, conform to scientific formulas. Consequently, it is concluded, there is no law in nature, neither natural, nor moral, nor of any other sort. Things do what they please, without regard to any universal context or environment; and it is simply an accident, with no implications of any kind, that things so conveniently conform in those ways which science successfully describes. The possibility of science, its existence and its continuous extension, it is concluded, carry simply no implications whatsoever regarding nature.

Now this is an error as disastrous to science, and also to society, as was the earlier dogmatism. Science has not ceased to be rational in becoming empirical. It still makes demands upon nature, although these demands have emptied themselves of all save logical content; and the plasticity of fact to the demands of logic is still a character of fact, carrying implications about the world at large. We will not develop this theme here; but we shall see, in our concluding chapters, that the true effect of Hume's criticism was not so much to invalidate

age; for what was Rousseau's rebellion, which unleashed hysterical revolution in France, compared with this rebellion which has challenged and still challenges every intellectual and social institution that cannot continue to justify its claim in terms of human experience? When Hume showed that the bond between cause and effect is no necessary bond, but a bond primarily of mental habit induced by past experience, and subject therefore to change in the light of new experience or experience better encompassed, he did no less than liberate human thought from human inertia. And in emancipating thought, he emancipated also action, to free at last the human race itself. Seldom, only occasionally as in his *Dialogues Concerning Natural Religion*, does that mighty imagination escape the rein of firm and even harsh restraint; but when it does, we realize that Hume liberated human thought in virtue of his own imaginative vision. He envisioned a nature that is free, moving, and intent, not to be deprived of its great leaping-times. It was a mystical adoration of natural freedom, of liberty in all nature, that moved Hume to cut those intellectual bonds which had confined the thought of man through earlier time.

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17 THE REVIVAL OF POLITICAL ABSOLUTISM

IN THE WRITINGS OF LOCKE, BERKELEY, AND HUME we see the development of an empirical philosophy which in its theoretical and practical teachings expresses the outlook most characteristic of modern man. It is emphatically a liberal or libertarian philosophy. In its study of science it elevates particular fact, which is an apprehension of individual being, into the chief criterion of truth. In its moral and political teaching, it makes the human individual the source and seat of authority, and the welfare of individuals the objective of government.

This empirical and democratic development has proceeded freely and unobstructed chiefly in the English-speaking world, *i.e.* in Britain and America. It has not, generally speaking, characterized the thought and practice of continental Europe. European thought has remained bound by rationalistic habits long induced by medieval scholasticism, and never completely renounced; and European governments have been for the most part feudal, monarchical, or otherwise absolutistic. The intellectual and political collapse of continental Europe in our century is the consequence of this failure to advance from ab-

absolutism; and the forms of political absolutism so generated are many and diverse.

In Britain and America, the movement to democracy was initiated by the first English revolution, which resisted the violence done by an absolute monarch to his subjects' religious convictions; and this first revolution gave to all the later political development a religious significance and support. On the continent of Europe, the revolutionary movement proceeded under different auspices to a different outcome. The Cartesian philosophy, in spite of the idealistic efforts of such men as Spinoza and Leibniz, tended to become a physicalism or materialism which sees in existent reality only a universal physical mechanism. The Cartesian concept of natural science was usually the resource of progressive thinkers who desired to carry society out of medieval darkness into truth, and to strike off feudal shackles which were clamped ever more oppressively upon continental peoples, the more the inadequacy and injustice of feudal forms became apparent. In France, the materialistic tendencies of Cartesianism were further strengthened as a result of the ecclesiastical support given to the monarchy, which bought this support by extending protection and privilege to the established clergy. The reform movement became anticlerical, and from anticlericalism it was easy to proceed to materialism and atheism. The result was a confusion of progressive and religious currents which has defeated political progress on the continent of Europe from that day to the present. The struggle between progressive and conservative factions became extraordinarily bitter, and revolution became unnecessarily bloody, cruel, and the cause of social vendetta.

At first, the Enlightened intellectuals who led the party of reform gave some recognition to religious faith. Voltaire, Helvétius, and other liberal thinkers professed *Deism*, a view which held God to have created the world, but which rejected the conception of revealed religion that a divine providence works in or upon man at all times. According to the Deist,

beyond the empirical evidence, and in some respects contradicts that evidence. It would seem, for example, that just as physical theory was importantly modified when it was extended to cover the analysis of chemical phenomena, so it will again be modified when it is extended to cover organic and mental phenomena. A physical science developed to the point where it could be made to comprehend all fact whatsoever would explain the phenomena of human morality and religion; and so comprehensive a science would need to distinguish, and could not reduce to a common physical level, the activities of moral man, of sensitive animals, and of inanimate bodies.

In France, rationalistic thought delivered itself of its absolutistic political implications in the teachings of *Jean Jacques Rousseau* (1712-1778), whose writings were perhaps the chief inspiration of the leaders of the French revolution. Rousseau was an unhappy, neurotic, expatriated Swiss, whose gift of impetuous eloquence made him the spokesman of oppressed and unhappy France. His chief political work, *Le Contrat Social*, incited the French people, as later it incited other peoples, to revolt against their feudal and monarchical forms of government. But Rousseau's book also provided the concept upon which was established the absolutistic political theory of the centuries which followed.

The most distinctive feature of Rousseau's political teaching is this concept of the *general will*, by means of which he intended to reconcile individual freedom with absolute state power. The political unit should be small enough, he taught, to allow its citizens to meet together in general assembly, to participate individually in debate, and to reach their decisions by majority vote. But what is it in the majority vote that carries authority over all the members of the community? The majority vote has this authority, Rousseau says, because it expresses the *general will*. This is the will of the community as a whole, shared by all citizens including even those who voted against the measure. The majority vote expresses the "essence"

it must have a universal and compelling force . . . The social compact gives the body politic absolute power over all its members . . . The voice of the people is the voice of God."

This is very far, we should insist, from the political theory upon which our own democracy is established. We agree with Rousseau that the ballot is the fairest and most expedient means of determining public opinion and electing an administration; but we do not believe with Rousseau that the use of this method requires us ever to renounce our individual judgment, and to accept the vote of a majority as the voice of our "real" conscience. If an Aryan majority should vote to exterminate a non-Aryan minority, if a white majority should vote to enslave a Negro minority—is that the voice of God? It is not Rousseau's faith out of which grew our American institutions. These were established to define and to limit the powers of the state, to protect minorities, and to place moral sanctions wholly and forever in the individual conscience. But Rousseau's concept of the general will was the faith out of which must grow, steadily as the decades pass, absolutism such as we see growing in our world today. We must know that there is no general will. There are only individual wills.

Several things conspired to disguise from Rousseau the absolutism implicit in his theory, or to reconcile him with it. He proposed to limit the size of the state so radically that no established government, possessed of permanent power, would be needed. The whole community could in this case gather in general assembly to exercise its political responsibilities; and this would tend to prevent the alienation of political power from individual citizens to some well-entrenched caucus or political machine. But the proposal to limit states to small townships is wholly impracticable. The irresistible movement of civilized society is toward states of continental size, exerting highly concentrated power. It is the more important therefore to define governmental powers, and to secure the principle of individual and minority rights. In the large modern state it is

political revolt that was to incite a no less violent reaction; and the path of social progress in France became tortuous and difficult.

Like the Cynics and Cyrenaics of ruined Greece, Rousseau sought refuge from social ills in the ideal of the "natural man," emancipated from all social convention and completely good in his original nature; but where the Greek reformer identified this original nature with reason, Rousseau identified it with feeling or sentiment. This appeal to feeling made him a prophet of romanticism, and one of the forerunners of the later "revolt against reason." Thus Rousseau's social rebellion initially indicted the whole development of civilization, with all of its moral and intellectual outcome. He held up the "noble savage" as the proper ideal of a humanity freed from the corruptions and diseases of civilization. (This ideal was of course a sheer fiction. Primitive or "savage" man is far more bound than are we by tabu and social convention, and the history of civilization is that of a progressive emancipation of the individual; but it was a fiction giving forceful expression to a revolt against moral and intellectual restraint which has moved underneath all later European life, and which finally broke through the surface of moral "convention" to perpetrate the massacres and brutalities of the last three decades.) By replacing the natural and spontaneous relations among men with a wholly artificial structure, Rousseau taught, civilization induces an unhealthy growth in which man grows progressively more corrupt. With his natural sentiments deformed by unhealthy arts, and with his native intelligence destroyed by a cold and artificial intellectualism, man developed an industrial economy which divided society into the wealthy and the poverty-stricken, and then established a tyrannous state which sanctified and perpetuated economic injustice as political "justice." Civilization and the intellect, he concluded, are all our woe, our progress is truly a progressive decay, and health is to be regained only by sweeping out of existence the whole corrupted fabric of civilized

the thesis which is fundamental to "progressive education" to-day. Its attack upon a too formal education, and its concern for the vital development of the individual child, have never ceased to be provocative of educational reform. There is moral and religious significance in its rejection of the doctrine of original sin, a tenet of the Calvinistic faith which originated in Rousseau's birthplace, Geneva. Yet this pedagogical theory, like most of Rousseau's thought, is equivocal. To remove children wholly from adult influence, say by letting them grow up together in the woods, would be to produce something neither animal nor human, and nothing like what Rousseau envisaged as "the natural man." Any and every educational program, whether it be progressive or formal, will provide an environment which is stimulating in some ways and restraining in others, and which will importantly condition the child's development.

What Rousseau and the progressive educator really propose, therefore, is to study the child as a growing organism and as a unique individual, and on the basis of this understanding to provide stimulation and opportunity adapted to the individual child; and such education may go far beyond that casually provided by the adult society which is the child's environment. A pedagogy of this sort will indeed be more effective, and determine the character and personality of the pupil much more deeply and strongly, than a formal and stereotyped education. Such education requires, of course, a more intimate understanding and closer care of the individual child by the educator, with more effective direction of the child's development. The result of such education will depend almost wholly upon the character and ideals of the educator. A liberal educator will produce liberals, a revolutionary will produce rebels, and a reactionary will produce reactionaries. The progressive educator is self-deceived, unless he is of the sort that just turns his pupils out to grass, if he thinks of his pupils' development as in some peculiar way a natural growth. He himself, with

whole people; and this ascription of absolute moral authority to one part of society, that expressing its "will," necessarily requires the extension to that part of an absolute authority recognizing no limits to government. A group or class so empowered could never be justifiably nor successfully challenged. The town meeting can no longer be our government. The democratic spirit of the town meeting had to be built into the Constitution of the United States, setting limits to government in the interests of individual liberty.

It should be remarked that the political theory of Rousseau has nowhere, neither in France nor elsewhere, supported a stable and healthy democratic society. To affirm that men are basically good is not to affirm that any and every majority is necessarily and absolutely right, so that not to accept its decision is to convict oneself of immorality. If there is a general will, why must it locate itself in a given majority? Why might it not locate itself in an intelligent, specially trained, intensely patriotic, or hereditarily privileged minority? The absolutists seized upon Rousseau's concept, and discovered the general will to reside in aristocratic national tradition (Burke), in a feudal monarchy (Hegel), in racial or national exclusiveness (Fichte), in the sheer will to power (Nietzsche), in imperial ambition (Mussolini), in a divine emperor (Japan), in the proletariat (Marx and Lenin.) The doctrine is just what democracy must and does reject. Constitutional democracy secures the absolute rights of *all* individuals, allowing to government only limited and delegated powers. Political absolutism secures absolute power to some group, ostensibly the vehicle of the "general will," and therefore identified with "the state." For democracy there is no state or states, there are only individuals and their governments.

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18 KANT: CAN RATIONALISM AND EMPIRICISM BE RECONCILED?

WE HAVE NOW SEEN THE TWO OPPOSED INTERPRETATIONS of modern science. Descartes and his successors perpetuate the rationalistic interpretation in a modified and more exacting form. They hold that reason is equipped with certain absolute principles or concepts which apply unfailingly and of necessity to every detail of particular fact. Natural science accordingly is just the continued application to existent fact of these absolute principles defining the ultimate structure of the universe. The empiricists, on the contrary, insist that natural knowledge is derived from experience, and consists of empirical generalizations summarizing observed particular facts. Their criticism of rationalism culminates in Hume, who concludes that even the best-established principles of natural science fall short of absolute certainty, and possess only a high probability as habits of mind determined by past experience.

It would seem that neither of these opposed views can be completely discounted. Rationalism failed to explain such principles as the law of gravitation, which seems to be universal in scope although it is not a self-evident or rational

temporary thought. If we will return to the spirit or intention of Kant, while renouncing his false premises, we shall succeed where he failed. We shall reach a conception at once rational and empirical, able to embrace the largest insights of past philosophy.

Immanuel Kant (1724–1804) lived the uneventful life of a professor at the remote University of Königsberg in northern Prussia. He had some Scottish ancestry, awareness of which may have made him more susceptible to Hume. His family was Pietist, a fervent sect similar to our Quakers. His education was of the very formal, scholastic sort then prevalent in Germany. This education gave him a horrendous vocabulary; but it strengthened his conviction in the integrity of the largest intellectual tradition of western thought, that which came from Greek antiquity.

The philosophy imbibed by Kant in his school education consisted chiefly of a scholasticized version of Leibniz; and it is evident from Kant's *Inaugural Dissertation* that this study had already made him aware of certain difficulties in the rationalistic philosophy. He had learned from Leibniz that the general principles of reason could never disclose anything concerning the location in space and time of a given event. Even if we were to suppose all of the general principles of physical science to be given to us with the reason, these principles would never necessitate the existence of a solar system, with a sun having just this mass and just so many planets. The general laws of matter would never reveal how matter is distributed in space and time. This meant, Kant saw, that all actual knowledge requires experience, and that the world in its concrete content is a contingent world. But it was the study of Hume, Kant tells us himself, that "awoke him from his dogmatic slumber." Kant was the first, and remains one of the few, to grasp the full implication of Hume's criticism; and it was because he comprehended Hume's teaching that he realized its inadequacy as a description of human knowledge, and set him-

reacting according to known mechanical laws. Kant did not share the view of the earlier empiricists that scientific method may be applied to human nature, to produce a science of human behavior. In his conception of science, he remained Cartesian and dualistic. There is physical nature, subject to mechanical law; and there is the human mind, which faces and knows a physical nature of which it is no part. Leibniz had written, in a late work critical of the empiricism of Locke: "Yes, everything in the mind is derived from experience—except the intellect itself!" Kant subscribed to this view. The mind is not merely a part of nature. It has its own constitution and its peculiar sort of activity; and this intellectual constitution enters into all our knowledge. Kant's problem was to show how the intellect with its fixed principles combines with the empirical material provided by the senses, in such a way as to do violence to neither element. It is clear, he believed, that the most basic intellectual principles cannot be derived from experience. They are and remain authoritative, and to deny their authority is simply to end in skepticism. Hume might say that there is no necessary causal connection in nature, that a stone flung into the air might just as easily—that is, for aught we know—fly up to the moon as sink to earth. But suppose that just one stone, so flung, did not fall to earth—would not the scientist look for a cause? Would he not reclassify stones into gravitating and nongravitating substances, and persistently seek until he had found the deeper law, or the underlying natural necessity, which rules both? Science affirms causal determination in nature; it does not merely affirm a subjective determination of human expectancies. Science has never had to retract this demand, nor could it retract the demand without committing suicide. Not to require causal connection in nature would be to suppose that anything, or nothing, may cause anything. It was in the interests of empirical science itself, we should see, that Kant took issue with Hume.

So Kant will establish empirical science and philosophy in a

this is the sort of proposition that could be wrong, and is established only by empirical evidence, *i.e.* by observation or experiment.

Mathematical propositions, then, are a priori and rational; but do they constitute real knowledge, or are they, as the empiricists implied, only a knowledge of words or ideas? Kant recognized that there are such purely nominal definitions, merely disclosing what is meant by a word. Thus the sentence "a dog is an animal" is necessarily true, but it is true only because the word "dog" means a certain sort of animal, and what is not an animal could therefore not be called a "dog." Such propositions Kant calls *analytic*, because they only analyze the meanings of words, and do not necessarily tell us anything about the world. "Angels are bodiless spirits" is a perfectly good analytic proposition, because it correctly defines "angels"; but it tells us nothing about the world if we have no empirical evidence that angels exist. If the propositions of mathematics are of this analytic sort, their absoluteness is of little importance, since they need describe nothing in the world. (This was Berkeley's view, and at times Hume's.) But Kant holds mathematical propositions to be *synthetic*. They cannot be reduced to nominal definitions, he says, because they do more than state the meanings of words. The word "triangle," for example, may necessarily mean three intersecting lines; but it does not logically imply that the angles of a triangle sum up to 180° . One might know the meaning of "triangle" without knowing this. Yet everyone believed, when Kant wrote, that a triangle necessarily contains angles to the sum of 180° . Thus Kant reaches his conclusion that the propositions of mathematics are at once a priori and synthetic. They are necessary, certain, absolute, universal in their truth; and yet they constitute a knowledge of fact, *i.e.* of things, and not merely a knowledge of words and their meanings.

How, Kant asks, is such a priori synthetic knowledge possible? How can we have an intuition into the universal, absolute,

do in mathematics. They see numbers, but do not count and name them.

The second level of mind is built upon the first. It produces an order defined in the *categories of the understanding*, such as relationship, causation, substance, etc. These categories play into all our ordinary thinking; but they are most consistently applied in science, which carries further the modes of thinking used in common sense. These constitutional forms should not be thought of as passive or inert. They are the forms of our conscious activity in perception and intellection. They are fixed and definable ways of organizing, ordering, and cataloguing sensations.

But why, and by what right, does the mind organize its sensations first into temporal succession and spatial order, and then into the more complicated and specific spatiotemporal patterns we call "causal processes," "substances," etc.? The librarian, cataloguing his books as they arrive, follows a general plan of some specific sort. He may catalogue them alphabetically, or according to the date of their publication, or by their subject matter, or in some complicated way using all of these orders. What plan does the mind follow? Its ultimate aim, Kant says, is unity, a single all-comprehensive system. Evidently, the sort of pattern that results will be determined in some degree by the sort of sensory material that is to be organized; and we can accordingly specify, in some degree, the sort of pattern that is reached. For example, all of our sensations whatsoever belong in the time-order; but only some of them enter into the space-order, while others do not. Those which are spatially ordered we attribute to external reality; and our effort to organize these into unity is guided by our idea of a completed world. We never actually complete this organization, so that *the world* remains only an ideal, always in the making. Those sensations which cannot be spatialized Kant attributes to our internal reality; and these are organized in view of an idea or ideal of *the self*, which again, of course,

perception, because perception is composed of sensations so ordered. Similarly, we may be sure that every perceived event will have its determinate causes and effects, and take its place in the physical order revealed by science. Science is established, consequently, upon a solid basis of rational and necessary truth. Its basic categories are beyond dispute.

However, there are important negative consequences flowing from Kant's study. These rational principles are really principles of mental procedure. We cannot change them, because they are constitutive of thought; yet they do not, as they stand, describe anything outside of the mind. They cannot be called "principles of absolute being." They become descriptive only when they are actually applied in the organization of sensory material. Our knowledge stretches, therefore, only as far as our experience extends, or perhaps as far as human experience extends, if we may believe what others have seen. It follows that although the principles are universal and absolute, the knowledge which they produce is not so, because it extends only as far as a limited human experience. "Concepts without percepts are empty, percepts without concepts are blind," wrote Kant in a justly famous phrase.

Kant seems to have reached his objective, which was to reconcile the apparently opposed claims of rationalism and empiricism. The rationalist is correct in his defense of absolute principles, but wrong in his claim to absolute knowledge. The empiricist is right in claiming that knowledge derives from experience, but wrong when he denies absolute principles. The truth is, Kant holds, that we have actual knowledge when the material provided by experience is properly organized by means of absolute principles—and only then. Knowledge is more than a summary of past experience; but it is less than an insight into universal being. Knowledge is the integration of a limited experience in the direction of an ideal of unity which lies beyond experience. If we could integrate all experience, we might achieve this ideal, and know absolute being; but

is infinite in time and space, yet also finite; that nature had a first cause or beginning, yet that every beginning had its earlier cause; etc. The principles of reason in this way themselves prohibit or rather protest their abuse. They are regulative principles, not descriptive truths. They work well so long as we use them in the description of some limited part of nature, *i.e.* apply them in the analysis of particular fact. But they collapse when we try to make them the pillars of a knowledge of absolute, universal being. The reason, as Locke saw, has its inherent limits. It is the indispensable servant of empirical science; but it is useless when divorced from experience, as it is divorced in all metaphysics.

But at this point we must ask: Do we not begin here to undermine the power or validity of empirical science, as well as that of rationalistic metaphysics? Should we not suspect that principles which collapse when we work them too hard are less than reliable even where they seem to serve well? How do we know that the regulative, organizing principles of the mind give us knowledge of reality when we apply them circumspectly, in actual experience? We cannot know, Kant replies. *The world* that appears to us in perception, and that is described by empirical science, is a *phenomenal* world. It is something we ourselves construct; and since we can never get out of ourselves, to see the world without looking at it and to know the world without thinking it, we can never know the relation of our knowledge to that *noumenal reality* which is reality-in-itself. We are like a person who is given a few of the fragmentary words or syllables which, in their totality, compose a story, and who is challenged to reconstruct the story. We know certain rules of composition, and we do our best; but there is no one who knows the original story, to tell us how nearly we are reproducing it. Is our version at all creditable? Or, dreadful thought, is there no original? Do we compose only our own dream? Is science *reconstruction* of the real, or is it merely a human construction or artifact?

the phenomenal fire merely. The appearance of fire we could extinguish merely by closing our eyes or moving elsewhere. Thus we move in a real world, we act upon real things, yet we see and know only appearances! And what is more, we know the difference between extinguishing the fire itself, and removing its appearance! Somehow, therefore, we do distinguish between phenomena and noumena; and this involves knowledge of both. The positivistic doctrine, moreover, becomes immoral when it is applied to living organisms. We must believe that a dog's yelp indicates real pain in the dog, not merely the phenomenon in our minds. We must believe that our sympathy helps a real person to forget a real sorrow. As Kant will recognize in his study of morality, moral insight must penetrate through appearance and reach reality, if moral judgments are to be valid. But moral judgments are conditioned by factual judgments, and are valid only if these are true.

We may conclude, perhaps, that Kant's study of knowledge reveals its own failure by thus issuing in phenomenalism. We may not buy our faith in science at so high a price. But Kant's study is valuable even in its failure. It has revealed to what degree science is an elaborate edifice, constructed by the mind. Kant, following the empiricists, has invalidated the old naive realism which took knowledge to be a direct reflection of an external reality in the eye or mind. Further, he has shown that the effort to retain universal rational principles, at least if we accept also the empirical view that natural knowledge comes from experience, leads to a new sort of skepticism, namely phenomenalism. It would seem that any regulative principle which is imposed by the mind upon experience, and which introduces into experience its own structure, must have this outcome. To avoid this skeptical outcome, we would need regulative principles which merely open the mind to what lies outside of the mind. To see, we must open our eyes. To know, we must open our minds. What would such principles be, requiring us to open eyes and mind?

reappears in the Kantian dualism of phenomenon and noumenon, appearance and reality.

These difficulties or inadequacies in the Kantian philosophy were apparent in Kant's day, not least to Kant himself; but they were inescapable then, and for long afterwards. Once we suppose that certain principles, for instance those of mathematics, are at once absolute or rational and necessarily descriptive of the world, we are caught in Kant's dilemma and impelled toward Kant's conclusions. *The great value of Kant's philosophy is first to have clearly defined, in its definition of a priori synthetic propositions, the essential core of rationalism; and then to have shown the inevitable consequences of rationalism, in phenomenalism or positivism.* No one has shed so much light upon the intellectual process, with its rational and empirical elements and their relationship, as did Kant.

But today this foundation of a priori synthetic knowledge, upon which Kant established his whole study, no longer exists. Within the twentieth century, advances in logic, mathematics, and physical science have shifted the weight of evidence against Kant's basic premise stating that the propositions of mathematics are a priori yet synthetic. Physicists now treat geometrical theories as physical hypotheses, modifying them as required by the observed facts; and this means that geometrical propositions are synthetic or descriptive of fact, but not absolute nor a priori. Logicians, on the other hand, have shown that the axioms of arithmetic may be regarded as analytic propositions which merely define the uses or meanings of symbols. Thus *the evidence today no longer supports the premises upon which Kant's study was based.* When Kant wrote, all extant evidence supported his belief in the existence of a priori synthetic propositions. Today, if this belief is not conclusively falsified, it is at least shown to be dubious and precarious. This shift of evidence in Kant's disfavor does not imply that Kant was mistaken in his acknowledgment of a rational element in

ciples, had believed in absolute moral principles. Kant finds no *a priori* and synthetic moral truths, corresponding to those of mathematics in science. Because he had established all scientific knowledge upon this basis of *a priori* and synthetic principles, he is compelled to deny the possibility of every sort of moral science, even or especially an empirical moral science such as the utilitarians pursued.

What then is moral insight, if there is neither a rational science establishing absolute moral principles, nor an empirical science deriving moral knowledge from experience? Is moral judgment arbitrary and irrational? No, Kant replies; it is, on the contrary, the only sort of judgment that might be called absolute and wholly rational. Moral judgment, Kant believes, penetrates through the curtain of phenomena which veils us from reality-in-itself, and really grasps, in full and naked immediacy, its noumenal object in reality. Kant is recognizing here that although we may fail to describe ultimate being in conceptual formulas, we are ourselves real and ultimate in our movement and conduct. Correct moral judgment is therefore right conduct, intelligent practice. An act is right, Kant believes, if it is motivated wholly by good will; and in our conscience we have awareness of our motives. We cannot see into other hearts, and know their motives; and so we do well not to judge others' conduct. When we are motivated by good will, Kant implies, we have true insight into the individual situation upon which we act. Conscience is a sort of knowledge; but because it is an individual awareness of a unique particular situation, it does not provide general principles nor moral theories. What has been prescribed as general precept and moral code, Kant says, truly amounts only to a classification of the material situations in which the moral drama plays. We may speak of cases of honesty or dishonesty, kindness or cruelty, etc. But what makes an act honest or dishonest, kind or cruel, is its activation of an individual moral insight which is never duplicated. The noumenal reality which appears in the

Kant's moral doctrine has been much debated since he presented it to the world, some accusing it of being empty, others proceeding to infer from it a whole code of moral precepts. In the writer's opinion, such debate is today out of place. Kant's formulation of moral doctrine was based upon the conclusions of the first *Critique*; and these conclusions required the absolute separation of judgments of fact from moral judgments. But we no longer accept the assumptions, and therefore we escape the conclusions, of the first *Critique*. However, Kant's doctrine is far from being empty. It presupposes a plurality of persons or human individuals, each an end or ultimate value in himself, and each possessed of individual rights and of responsibility for all other individuals. It is, in short, the moral theory of Locke, upon which was established democratic society; and the writer confesses that he has found no other doctrine upon which democratic justice can be established.

It is in truth a metaphysical doctrine, affirming that human beings are ultimate, irreducible, plural, and individual—or it would be a metaphysical doctrine, if this irreducibly individualistic pattern of human nature were extended to all of nature and made universal.

If Kant's ethical doctrine provides the indispensable foundation of democratic practice, Kant's political theory falls short of what we might reasonably expect from him. It is true that he explicitly locates moral responsibility in the individual, and denies that the state has an intrinsic value and authority; yet these explicit statements are prejudiced by the admission that the state is a necessary condition of moral conduct and individual freedom. This view would ultimately compel us to allow to the state an unquestionable and absolute authority. This conception, we have seen, goes back to Rousseau and Hobbes, who also conceived the state to be the necessary source of all morality. It is not consistent with the Kantian ethics, which defines the human individual as a moral being, independent of any political organization. Truer to his ethical insight is

science becomes ineffable, and can express itself only in action. Knowing and doing must proceed in different worlds. Science and morality face opposite ways.

Kant, it seemed, had wholly sundered science and morality. Yet in his first *Critique*, Kant had taught that our knowledge of the world and our knowledge of the self should ultimately be brought together in a comprehensive synthesis of experience, under the regulation of the Idea of God. In his third and last *Critique* he attempted this synthesis.

The *Critique of Judgment* should have been the crown of Kant's philosophical study and the keystone of his great architectonic; but it was in fact a supreme and tragic failure. All of its great enterprises tail off into negative conclusions. Kant pays in this book the full price of the errors of the earlier *Critiques*. And yet, through this explicit failure, there shines like a great promise the suggestion of what the book would have been if it had succeeded. Here, as always, Kant's genius lay in his grasp of the speculative problem and the right approach to it, and not in his attempted solution of it; and in this third *Critique*, the problem attacked is the last, most ultimate of all problems, namely the relation of human life with its effort, its conscience, and its consciousness, to the world environing and generating that life.

Let us first appreciate the *Critique of Judgment* in its grand plan; and only then consider why the vast projection failed! The book proposed what seemed impossible, a synthesis of the first two *Critiques* bringing together the two domains of scientific and moral cognition, which had there been defined in such a way as to exclude each other. With the simplicity characteristic of genius, Kant points out that the only likeness between a scientific judgment and a moral judgment is that both are judgments. If we knew, therefore, what is involved in any act of judgment even as such, we should have a clue to the connection between science and morality. What, he asks, are the presuppositions of any and every judgment?

lime; and in works of art, he distinguishes talent from genius and technical facility from aesthetic insight.

What more can one say concerning this character of aesthetic value or beauty? What is its claim upon us? It does not incite, but rather discourages, intellectual analysis and formal classification. We feel that the beautiful object is consummate, that it fulfils itself and beggars description. It makes and meets a claim, it realizes a need which is not ours but its own. All beauty, Kant concludes, is apprehension of some realization of individual being. We love the thing for its own sake, not for our sake. This quality of beauty, this mark of individual self-realization, seems to be wholly objective and independent of our minds.

At the root of all judgment whatsoever lies this aesthetic apprehension of objective individual being; and presumably all science and all morality, in their movements to comprehend experience and enrich judgment, do no more than integrate or synthesize this basic and primary aesthetic aspect of reality. Nor does there seem any limit within experience to this aesthetic quality. Nature is beautiful in our widest perception of it, for example in the night sky with its illimitable distances. Does all scientific and moral comprehension of fact only formulate our aesthetic apprehension of reality? Can we say that nature at large realizes itself, and thus manifests purpose and aim? Do science and moral insight conjoin, to reach this final insight into a reality which in its largest design, even as in its most particular detail, reveals a single purposive intelligence? This would indeed make science and morality consummate, by showing them to be respectively the theory and the practice of a religious apprehension of universal being.

This is the sort of synthesis that is suggested in the third *Critique*; but the plan is not carried out, because at each step some obstacle arises to prevent its advance. Thus Kant will not allow cognitive status to aesthetic insight, because he finds no a priori aesthetic principles regulating aesthetic judgment. We

mechanical clock serves the purpose of its maker. We have no right, he says, reverting to the arguments of the first *Critique*, to make statements about a completed universe, since experience is but fragmentary. If nature provides the conditions of human life, it is no less true that man helps to provide the conditions of plant and animal life. Kant concludes that the apparent beauty and the seeming purposiveness of nature are no argument for religion. Religion stands or falls as a necessary presupposition of moral conduct. Because virtue evidently receives no reward on earth, Kant means, belief in God and immortality is required to make moral effort reasonable. No rational establishment of religion is possible. Religion has no intellectual defense, no relation to science, none to art.

Two motives influenced Kant in this destructive third *Critique*, which suggests a rational conception of religion only in order to invalidate that conception. One motive was his desire to leave absolute authority to moral judgment, which he feared would be weakened by any dependence upon aesthetic or even religious presuppositions. The other was his inability to conceive of a science not identified with mechanistic physics, or to modify in any way the assumption and conclusions of his first *Critique*. The first and third *Critiques* do in fact collide head on, in such wise that the insight of the one precludes that of the other. The first *Critique* was concerned to establish universal principles supporting science; and to do this, Kant was compelled to deal with particular character as a mere filling or content, wholly subjected to and articulated by these principles. The third *Critique* aimed, however, to explain the relation between particular character and these universal forms of judgment; and this required some appreciation of particular character as such, in itself. Kant recognized the ubiquity of particular character in experience, and the aesthetic faculty by means of which we immediately apprehend it; but he could not develop this empirical theme, nor allow particular character to mold the principles and shape the larger concepts of natural

human thought may today be brought to a successful conclusion. But between Kant and ourselves lies a century of social and intellectual development which has rather radically re-oriented thought. We must know something of this recent history if we are to understand the contemporary mind. In reviewing this history, we should not forget that behind it there still stands the great issue, which we have followed since the beginning of our study, between those rational and empirical tendencies of mind which in their composition are creative thought, and in their disruption intellectual and moral skepticism. Kant's problem still remains, essentially as he stated it in his three immortal works. One may "get around Kant," as some contemporary philosophers advise—but only to return by some detour to this crucial nexus of intellectual life, which Kant faced so squarely, and which he failed to untie only because of his fidelity to what seemed at that time the undeniable fact that natural science stands upon a rational system of absolute mathematical knowledge.

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19 DIALECTICAL IDEALISM

WE CONSIDER IN THIS CHAPTER THE THOUGHT OF Hegel, and so take up issues which are very much alive today, when they are the subject of controversy which has moved from the lecture hall to the field of battle. From Kant, as from Socrates in antiquity, radiated movements in several directions, sometimes diametrically opposed. The most important of these movements, viewed in the perspective of today, is that which culminated in the dialectical philosophies of Hegel and Marx.

To understand dialectical philosophy in its historical sources, we must turn to a passage of Kant's *Critique of Pure Reason* entitled "transcendental dialectic." Here Kant warns against the abuse of a priori principles. These principles are properly used empirically, *i.e.* in the organization by the scientist of perceptual experience or observed fact; and apart from this use, they are empty and describe nothing. Kant believed that when these organizing principles are taken to be descriptive in themselves, independently of factual content, they lead to self-contradictions and absurdities. For example, logical principles are indispensable to the construction of intelligible hypotheses, descriptive of natural processes; but we must not suppose that the rules of logic constitute of themselves, prior to their ap-

edge. Dialectical philosophy usually refers to the conceptual system elaborated by these post-Kantians.

The chief propounders of this dialectic were Fichte, Schelling, Hegel, and Marx. We will shorten our discussion by considering only very summarily the first two of these men. *Fichte* appropriated the Kantian vocabulary so thoroughly that an early essay was mistaken by the printer for a work of Kant, and published as such. The degree to which Fichte appropriated the thought of Kant is at least debatable. He distinguishes science which is merely empirical, and which he equates with materialistic philosophy, from a dialectical "science" which he called *Wissenschaftslehre* (theory of knowledge). The *Wissenschaftslehre* presents an idealistic metaphysics discounting the material world as only phenomenal or illusory. The illusion is projected by the Self or Will (the "transcendental Ego"), as the condition of moral or spiritual activity. The will is said to project "matter" in order to have something to work on. When the moral will slackens, this phenomenal projection of the Self hardens into a material world, ruled by mechanical inertia and reducing those who believe in it to slavery. Our duty is to throw off this illusion of mechanical necessity, and to liberate the true Self, creative in moral activity. According to the manner of man you are, Fichte said, you will choose between a mechanical science which enslaves you and the *Wissenschaftslehre* which enfranchises the creative Self. Fichte was also the ardent patriot whose *Addresses to the German Nation* helped to arouse Germany to resist the invader Napoleon. He assured the German people of their cultural unity and of their mission to spread this superior culture through the world. As a means to national unity, he advocated "the closed economic state." Fichte's exaggerated nationalism may be excused as a reply to foreign invasion; but there is no doubt of the historical continuity between his teaching and the national socialism of Nazi Germany.

Kant's successors rejected his equivocal stand on the metaphysical issue. They advanced the idealistic thesis that the most basic principles of reason, presenting the constitution of the mind, must of necessity be taken to define the objective structure of reality. This thesis is not improperly named "Objective Idealism," because it claims that all the objects we know are mental constructs. Kant's logical or dialectical analysis of the mind and its concepts was thus converted into a rationalistic metaphysics, claiming to discover by purely logical and non-empirical study—by a sort of intellectual introspection or "reflection"—the ultimate Being which is universal reality. The post-Kantian dialecticians variously modify and develop Kant's analysis of the categories of thought. Dialectical philosophy is a new, more extreme and more powerful form of the rationalism which claims that final, absolute, and universal knowledge is the achievement of an intellectual intuition, going beyond a merely empirical science which is able to advance only to probable hypothesis. Dialectical philosophy is a return to the rationalism of Plato, without his dualistic reservations.

To evaluate justly this powerful modern rationalism, one must consider the following facts. First, conceptual analysis of this logical sort is indispensable to every science, because science rightly seeks to bring into theoretical unity its diverse hypotheses. Only one science, physics, has as yet explicitly acknowledged this responsibility. The mathematical physicist is the "dialectician" who seeks to systematize the special hypotheses advanced by experimental physicists. It is all-important to observe, however, that the mathematical physicist does not ascribe finality to his comprehensive formulations. He recognizes their tentative or hypothetical character; and he expects the experimental physicists to apply his theory to observable fact, and to confirm or disprove it by this empirical test. This is a proper use of logic or dialectic. It leaves logic within science, subject to the empirical method of science to which it is auxiliary. Every science might do well to follow physics

confirmed or disproved, which conditions all scientific hypothesis whatsoever. It is the postulate that real being is identical with individual being. This philosophical truth is to-day well established, as will be shown in the concluding chapters of this book. Dialectical philosophy substituted for this truth the rationalistic error: Real being is universal being. We shall show how this error generates the confusion of mind which is dialectical philosophy. But we stress here that the dialecticians were justified in their pursuit of a truth transcending empirical hypothesis. There is indeed the absolute and final truth which supports and justifies all scientific hypothesis. There is scientific faith; and this needs philosophical establishment.

And now, after having appreciated these justifiable motives of the dialecticians, we must be rather severely critical. Fundamental to their systems is the false presumption that a reflective and merely conceptual analysis, unchecked by experience, can disclose the complete anatomy of universal nature. To reach their large definitions of universal structure, they simply borrowed the concepts of science current in their day, and wove these into a verbal pattern. They ignored or abused logic, pretending that their dialectic constituted a superlogic. The dialectic, they said, discovers necessary synthetic propositions, where ordinary logic discovers only analytic propositions. This dialectical "logic," using its "infallible rational intuition," is supposed to generate all scientific concepts in their true order, and to reach an absolute, all-comprehensive, and completely rigorous system of knowledge. This claim was really discredited by the dialecticians themselves; for their "dialectical logic" and "rational intuition" disclosed to different philosophers different systems, shaped to their personal predilections.

The Hegelian system still remains the superlative example of dialectical construction. Hegel despised Fichte and Schelling for the slovenliness of their analysis; and he certainly produced a far more closely knit and impressive architectonic. He starts

gradually unfolded its real but implicit content in all of the stages of physical and organic being; it comes to provisional consciousness in human intelligence; and its final and complete realization is philosophical understanding. Fichte identified ultimate reality with will; Schelling identified it with aesthetic insight; now Hegel identifies it with intellectual process. In his vast dialectic, Hegel tried to give meaning and plausibility to the idealistic thesis which states that reality is Mind. His philosophy has remained the chief resource of idealistic metaphysics.

The contemporary thinker may also return to certain Hegelian insights which are broader than the dialectical system, and perhaps independent of it. Some would say that Hegel's greatest work is not his *Logic*, presenting the dialectic, but the epistemology presented in his *Phenomenology of Mind*, which is a sort of preface to his more systematic writing. This is indeed a brilliant critique of the Kantian philosophy, and possibly the most brilliant defense in any literature of rationalistic doctrine.

It was necessary for any German thinker who did not identify himself with Kant to meet and overcome the Kantian critique of rationalism. We saw that Kant accepted the empirical teaching that descriptive knowledge derives wholly from experience, that he allowed to the pure reason only the task of ordering sensations entering the mind from outside, and that this sharp dualism of sensational material and rational order finally drove him to a skeptical positivism, limiting science to a knowledge of phenomena and allowing no claim to an intellectual grasp of "reality in itself." In the *Phenomenology*, Hegel criticizes Kant's absolute separation of sensation and concept. The "sense-manifold" of Kant, he shows, is unthinkable, and evaporates into nothing when subjected to scrutiny. The relation between sense-experience and knowledge is not just the relation of chaotic material to articulate conception. Perception itself is already perfectly articulate. Content void of form is as meaningless as form void of content.

power of that thought or succumb to its plausibility? Let us insist, for the moment, that science apparently cannot subscribe to it! The scientist must still separate his conception, *i.e.* his theory or hypothesis, from the particular sensed material which suggests and confirms his thought. How else could particular sensed fact confirm or disprove hypothesis? The scientist, moreover, must esteem sensed fact even more highly than he esteems the most comprehensive hypothesis; for otherwise the observed fact could not, as it does, overtopple the great theory which collides with it. Our question becomes: Is there a rational knowledge transcending science? This question we shall answer affirmatively, but not in Hegel's sense—there is no rational knowledge of the universe, comprehended in its eternal design.

We have not yet mentioned a certain aspect of dialectical philosophy which is what gives to this movement its present hold over the public mind. The modern intellect is now passing through a great metamorphosis, a change so profound, and in its symptoms so critical, that we may wonder whether the crisis will be successfully endured. We may indicate the nature of this change by saying that it is the transition from a spatial to a temporal orientation upon fact. The development of evolutionary science, and also perhaps the physical theory of relativity, give some indication of this profound reorientation of thought; and the popular appeal of dialectical philosophy is due to the popular assumption, partly correct but partly mistaken, that dialectical philosophy is an evolutionary doctrine, depicting the course of nature as it has evolved in historical time. We shall not be able to deal at length with this question here—that would require a separate volume; but we must stress the equivocal character of the dialectic, in its presentation of an "evolution" which at once is and is not a temporal progress. The dialectic requires us to conceive of an "evolution" which is fully completed, yet which eternally goes on.

Fichte, Schelling, and Hegel all make use of the word ^{medi}vo-

of being, and suggests a serial emergence of inorganic, organic, and human nature. One might in fact regard dialectical philosophy as an impossible and disingenuous effort to affirm evolution implicitly, even while denying it explicitly. We are asked to conceive of nature "as if" nature had evolved, even while denying its evolution. Reality, says the dialectician, can be understood only as a process of evolution; yet because the evolution is that of a timeless thought or reason, it is not a temporal nor an historical evolution. The evolution must be supposed eternally completed and eternally self-sustaining. The evolutionary process does not newly create, it only restores what eternally is. The dialectic really restates Neoplatonic philosophy; and it compels us to face the question whether nature is in fact an eternal re-creation of this sort, or a temporal creation still generating new species. If Darwin was right, and if species originate in time, the dialectic has no basis in fact. (It might be still defended, perhaps, on the curious supposition that animals and men always existed somewhere, on other planets or worlds, before they emerged on earth.)

But, in the writings of the dialecticians, this disingenuous "evolutionism" seems to lose its equivocal character when the last stages of dialectic, which deal with human society, are reached. In his social dialectic, Hegel drops the pretense of eternalism, and boldly outlines in dialectical terms the historical development of human government. He understands by human progress the long pursuit and achievement of liberty, which he defines as the perfect adjustment of the individual and the state. This part of the dialectic is given separate treatment, in a work frankly entitled *Philosophy of History*; and it was this social application which interested the general public, and which led to large appropriation of Hegel's thought. Hegel sketches at considerable length the rise of the state, in the form of an absolute despotism such as that of ancient China; and he follows its dialectical progress through Hindu anarchy, oriental empire, the Greek and Roman republics, Roman empire, medieval

dialectical interpretation of history. We will not agree that the individual finds his whole self-realization in the exercise of his functions as a national citizen. We will not agree that the state has a "reality" equal or superior to that of the individual, nor that the state should have absolute control of education, religion, and every cultural exercise. We will not accept the totalitarian principles, nor the state-worship, which are implicit in Hegel's political theory. Nor will we accept one very large implication of this political interpretation of history, namely that human progress has been advanced exclusively or even primarily through war. Hegel teaches that the cosmic mechanism by which the succession of dominant cultures generates itself, is that of civic dissension and militant conquest. In spite of his idealistic homage to Absolute Mind or Spirit, Hegel presents the evolution of human society in terms which make of it a very militaristic, material, and unspiritual pursuit of power.

It is unfortunate that so gifted an intellect should have been circumstanced and conditioned as was that of Hegel. Hegel looked to Prussia to unify Germany, and to support the new German nation against the pressure of its European neighbors. He became thereby, in spite of his liberal inclinations, the chief intellectual spokesman of the reactionary movement which followed the debacle of the French revolution. The totalitarian "theory of the state," by which Hegel intended to make the unity and security of Germany the controlling objective of every German and the ruling principle of German life, did in fact guide Germany through several aggressive wars and to enormous power; but the final issue of this teaching is political collapse and moral ruin. Unfortunately, the extreme nationalism which engenders, and which is again fostered by, this "theory of the state" has spread to every people. The immediate intention of the Hegelian political realism is to support unjust privilege, by attributing to those actually in political control, the *de facto* government, a mystical identity with the "spirit" of the people and a sanctified power.

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20 DIALECTICAL MATERIALISM

IT IS PERHAPS A GOOD SIGN, INDICATING A GROWING realism, that the contemporary mind entertains in dialectical philosophy a faith which, although it proceeds from rationalistic premises, nevertheless submits itself in the end to the test of empirical fact. The dialectic claims to show a necessary sequence in social history, a fatalistic direction discernible in past history and dominating of necessity the movement from present to future. This is to give to philosophy the role of prophecy, and to make the power to predict our final criterion of truth. One cannot consider dialectical philosophies purely academically, without reference to the social history which they claim to describe and foresee. This is the way society did, does, and must go, says the dialectician; and we are challenged to look and see whether it is in actual fact the way society goes.

The Hegelian dialectic took the national state to be the organ of social progress. For the impetus of progress, it looked idealistically to the intelligence of a people, effective in its intellectual elite. When we speak of history, we usually mean political history; and Hegel only conformed to orthodox opinion when he made the state the agency of social progress, this being the implicit assumption of most historians prior to Hegel

forces themselves. If economic fact determines political fact, we can determine what in our society shall be economic fact. We can regulate the national economy by means of political action; and this is to invert the Marxist view, and to revert to the Hegelian position. And now we perceive that political leadership was never so unaware of the Marxist truth that it omitted to secure some large control of the national economy. Throughout all history, governments have existed primarily for this purpose. Do not Marxists agree that any government which fails to do this is on the way out? The simple truth is that "the nation" is a political-economic system. The science of government is neither political history nor economic science, but political economy. What the Marxist correctly perceives is that the economic organization of society has increasingly overborne national boundaries, until it is no longer subject to political control. There grew up a new and large economy which today is world-wide. Our present convulsions are the effort to bring this larger economy under political control. Economic change gives rise to new political problems; but the solution of these problems is the creation of political institutions bringing economic change under new control. Economic activities condition political activities; and the result of political activity is to recondition economy.

We need, accordingly, a new social science, one that can appropriate both of the two half-truths which respectively support the Hegelian and Marxist dialectics. This science must, of course, undercut the error which is the dialectical method itself. Dialectical philosophy violates the first principle of science, which is the requirement of *causal* explanation. The dialectic, we said, arises out of the confusion of causal connection with logical implication. This is really a confusion of fact with language—the very confusion which the nominalistic founders of empirical science hoped to eradicate.

Our initial purpose here must be to do intellectual and moral justice to the Marxist philosophy of dialectical materialism. We

ligatory upon the social scientist. Very much as Darwin transformed all biological science by establishing it upon an evolutionary basis, very much as Newton established physical science upon universal laws of motion, so Marx inaugurated an empirical social science when he multiplied evidence of the casual connections relating social institutions to the social economy which conditions them.

There is some controversy today as to whether Marx himself was an "economic determinist" of the radical sort, who sees in all political and ideological fact only the manifestation of economic process. Neither party to the controversy has difficulty in finding passages in the writings of Marx to support its view. Neither party is mistaken, because Marx the social scientist was not an "economic determinist," whereas Marx the dialectical philosopher of necessity was this. Marx frequently and emphatically states the intelligible and true thesis that economic conditions constitute the most ubiquitous, constant, and dominant factor in social history, *causally working upon* the other political and ideological factors. Writing as a social scientist, Marx takes causation seriously and offers a truly scientific hypothesis. The economic factor could not be a causal factor, it would have nothing to work upon, if there did not exist in society other relatively independent factors in political and other institutions. But when Marx is writing as a dialectician he foregoes causal explanation in order to indulge in dialectical or "logical" explanation; and now the economic pattern becomes not merely the essential and dominant factor which it in fact is, but the constitutive and substantial Being of society, manifesting itself indifferently in economic, political, ideological and other forms. Here we relinquish the causal analysis of science, in order to pursue rationalistic metaphysics with its pseudological explanations.

If we reflect upon this contrast of Marx the scientist with Marx the rationalist, we shall discover the radical confusion of mind which generated dialectical philosophy, and which

authoritative social theory comparable with physical theory. It is because of this paucity of established social theory that we have recourse to social history; for we correctly conclude that the course of history provided by the responsible historian indicates causal processes which the theorist has not yet elucidated and defined. Social scientists are at present divided into two groups, one of sociologists devoted to social theory, and one of historians seeking to enlarge history. What we need today is greater cooperation between social theorists and social historians. This cooperation will scarcely be smooth and fruitful without clear understanding of the relationship between social theory and social history. Should sociology swallow up historical science, the historian becoming a collector of historical data useful to the social theorist? Or is history an independent study, proceeding without the help of theoretical guidance, and providing real knowledge of social process in spite of its nontheoretical character?

The distinction between social history and social theory lies in their respective uses of causal explanation. Both provide causal explanation; but the theorist explains the causal sequence of events as the manifestation of some known general principle, whereas the historian discovers causal connections to exist among particular events, whether or not the causal sequence illustrates some general principle. We meet here once again the ancient question which divides the rationalist and the empiricist: Do general laws actually *cause* particular events to emerge as they do? Or is all causation particular causation, the so-called "laws" being only our summaries of many observed particular causations? Be it observed that there is no quarrel between the theorist and the historian on this point. Both agree, as all scientists today agree, that "causation" means particular causation, and that generalization only discovers similarities among particular causal sequences. There is no "law" which necessitates particulars to be what they are and to act as they do. But the theorist is interested in particular events insofar as

torical hypothesis advanced by Marx, describing how the economic processes of medieval and modern society did in fact help to determine political and other history. We may distinguish Marx the scientist from Marx the dialectician, and judge his tremendous historical hypothesis impartially, taking it out of rationalistic polemics into empirical science, where it can be confirmed or disproved by factual evidence.

Marx took his communistic principles from post-Napoleonic France. His reading of European history was influenced by his long sojourn in industrialized England. But he was still conditioned in his thought by his earlier life in Germany; and as his thought matured, it took a form directly antithetical, and therefore in its largest character similar, to that of Hegel. Marx, it must never be forgotten, was a Hegelian. Hegel had conceived history to be a drama centered in the political evolution of government; and Marx never really rejects this political orientation. But Hegel had conceived only of a national state controlled by a privileged intellectual elite and advancing by way of national expansion; and this political orthodoxy had made him the spokesman of world-wide reaction against the universalistic principles of republicanism. Marx challenged this intellectual Goliath; and to defeat Hegel on his own ground he accepted Hegel's dialectical premises and also his political orientation, diverging in order to place the ultimate controls of political history in the people instead of in a privileged elite. This was the primary aim, we may perhaps agree, of the Marxist doctrine. Marx wished to show that it is the actual labor of the worker in the field or the shop, something he called the "mode of production," that finally dominates all economic, political, and intellectual life.

The rationalist, like the Aristotelian philosopher, must radically distinguish the essential form of a thing from the non-essential matter which it informs. The essential form of a thing is ultimately the universe working in that thing, and controlling its development and destiny. For Hegel, the essence

an increase of population, and that this is good. We must still observe that the mode of production, although it may condition every social institution, is only one of many factors. Czarist Russia with its serfdom, early New England with its freehold farms, and the colonial South with its slave plantations were all agricultural societies; yet how different their political patterns! Twentieth-century Russia, Germany, and the United States are all industrialized; yet how different their governments! Marx confused the fact that economic activities *condition* political activities with the supposition that economic form (the dominant mode of production) *determines* political form (the constitution of a society). This supposition cannot be defended. Liberty and tyranny are both possible in every society, whatever its economic mode of production. Economic progress does not necessarily entail political progress.

Marx was misled by the old fallacy of a *necessary* human progress. This fallacy is a rationalistic misstatement of the truth that there has in fact been much human progress, both economic and political. Economic progress is increased economic efficiency, which may be measured by the weight of product produced by one hour of human labor. This mightily increases as we move from agricultural to industrial society. There has been great economic progress. Political progress should be measured by the degree to which each and every individual participates in government, thus securing due control both of his individual economy and of the political economy. There has also been political progress. But there is no *necessary* relation between economic progress and political progress, nor is there any *necessary* progress of any sort. Russia by political means advances the economic progress of its vast domain, Germany by political means would have kept much of Europe agricultural. It is very clear to the discerning historian that the history of modern civilization is primarily the story of how economic and political progress have stimulated each other, and how failures of political progress have

which tries to see in physical necessity itself a god in disguise, taking Protean shape in biological, psychological, sociological, or other necessity. But in the twentieth century, when modern science has long been freed from its rationalistic swaddling clothes, and when every scientist and every intelligent and informed person knows that physical and other scientific "laws" are not universal natural necessities, but only our latest summaries of observed similarities, this residue of medieval rationalism has no place. We cannot change the physical habits of astronomical nature, and so we must accept its "laws"; but we certainly can change, and every day do change, the social habits of men and women. We do this by means of legislation, education, example, and persuasion. Society knows no law which it does not make itself, except that utter moral law which is the rule of all that exists, and which we have yet to elucidate.

We have considered dialectical materialism only in its social application, and have not referred to its larger doctrine, professedly showing how material being by dialectical necessity proceeds to unfold its implicit content of physical, organic, and, finally, social pattern. Nor shall we summarize this larger doctrine, if only because it can scarcely be said to exist, neither Marx nor any authoritative Marxist having troubled to elaborate it. Its materialism is a vague verbal gesture, dismissing idealism. The gesture is necessarily vague, because the concept of dialectical necessity is incorrigibly idealistic in its confusion of causal connection with logical explanation. Marx seems to have thought that his emphasis on material production required a materialistic metaphysics—as if the production of material goods by human labor were somehow only a physical process, and not as biological, psychological, and moral a process as writing poetry, devising political systems, or elaborating rationalistic metaphysics. But further, the discussion of contemporary materialism, including that of Marxists, would

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21 THE NINETEENTH CENTURY

OVER MUCH OF THE EARTH'S SURFACE, THE nineteenth century was a period of economic, political, and scientific progress such as the world had never seen. In Europe and the continents settled by its emigrants there was vast increase of population and of wealth. The indigenous populations of Asia and Africa were in effect subjugated by Europe, and not yet inclined to revolt. It was a century of relative peace, a long lull between the world war against Napoleon and that in which Germany would seek world empire. Politically, it was the century of imperialism. Britain was able to police the seas at little cost; and its power was tolerated because its policy of free trade made its hegemony profitable to all. The Americas and Russia were busy with internal expansion, France had moderated its imperialistic ambitions, Germany was not yet ready for its great gamble; and so peace was had by default.

We see today that it was an interim period, a last calm before the storm which in terrible convulsion would end that imperialistic age, and begin a new world no longer centered in Europe. But the nineteenth century dreamed of no such cataclysm. It looked forward to an indefinite future, in which its pattern of life would spread to the world at large. It sup-

cally, as a pursuit of private or special interests. The aim of the state must be, he said, to satisfy private interests by their union in public interests, and to educate its citizens by persuading them of this identity between private and public interests. The character of the individual, he taught, is determined wholly by the social environment; and moral character should be shaped by the state, which is thus the source of individual morality. The best state is that which seeks "the greatest good of the greatest number."

This conception is almost irrelevant to democratic theory. It defines aims which might be those of any government; but it says nothing about the sources and controls of governmental power. Democratic theory is distinguished from all other political theory by its location of responsibility in the moral individual, *i.e.* in all individuals. It is a political and moral faith, not a psychological theory nor an ethical doctrine. Democratic society may seek to realize through its appointed government any specific moral end; and its objectives will vary at different times and places. The utilitarian conception becomes definitely antidemocratic when it is conjoined with the view that the state is the source of individual morality. Jeremy Bentham introduced Helvetius' formula into British thought, in a utilitarian program which demanded for government an unlimited legal sovereignty; and he roundly repudiated the principle of natural rights. The sole test of law, Bentham argued, is its utility in securing the *general* welfare. This Benthamite movement helped to bring about the extension of democratic suffrage; but it did this as a means necessary to the passage of legal and other reforms, and not as an acknowledgment of democratic principles. Following the year 1832, when conservative reaction broke down, this reform group gave to Great Britain a century of progressive and liberal leadership; but democratic thought never fully recovered its grasp of the principle of individual responsibility, upon which alone democracy can be intelligibly and firmly established. Thus a century which tre-

the high optimism it had inherited steadily thinned and vulgarized itself, losing its impetus, until the confused impulse to faith was ashamed of faith, and retracted to a more honest skepticism. Schopenhauer, who saw the beginning of this century, was prescient of its end.

Arthur Schopenhauer (1788–1860) was a contemporary of Schelling and Hegel; and his greatest work, *The World as Will and as Idea*, was written in 1818 when he was thirty years old. Yet in his thought Schopenhauer was closer to ourselves than to his German contemporaries. Like those men, he moved from the great Kantian criticism to a form of metaphysical idealism; but his sojourns in France and England, together with his wide reading, had made of him a cosmopolitan thinker whose writings can be intelligibly rendered into any language. At first ignored, Schopenhauer before his death received wide recognition, and became something of a popular idol. His direct influence was upon the general public rather than upon professional philosophers; and this has perhaps obscured from us how great his influence was.

His first contribution was a simplification of the Kantian philosophy; but this simplification rather profoundly modified Kant's system. Kant had called space and time the two forms of perception; and he had made causation a category of the understanding. Schopenhauer taught that the two concepts of space and time of themselves compose the concept of physical causation, a view which finds some support in contemporary physical theory. He concluded that the spatial-temporal-causal pattern of fact is generated in perception alone, without help from the understanding. What then is the understanding and the scientific knowledge which it produces? The understanding, Schopenhauer says, seeks an abstract summary or generalization of causal relationships immediately perceived. Perception alone provides factual truth; but the understanding provides, in science, a useful schedule or compendium of perceived fact. With the help of this schedule, we can predict and con-

resistances, with other wills. All nature is this endless battlefield of conflicting wills. What we perceive is what threatens or supports our will-to-live. What is irrelevant to our personal survival we do not perceive. So, after first contrasting the falsity of systematic science with the truth of perception, Schopenhauer now tells us that perception also is a pragmatic and utilitarian faculty, and not an authentic, objective cognition; for our perception is the "objectification" only of our subjective purpose, our personal will-to-live; and it reveals, consequently, only a private perspective, in terms of our will or our vital needs. Perceptual cognition is true but subjective.

This conception is close to that elaborated by Bergson early in this century. Bergson makes science and ordinary perception the projection into nature of our practical and vital needs. In both thinkers there is this curious self-contradiction, that they at once dismiss science as an instrument not intended to provide descriptive knowledge, yet unconsciously appeal to science for the evidence for their conclusion. Does not science, Schopenhauer argues, demonstrate nature to be a conflict of interacting forces? Is not this concept of force the ground principle of modern science? What are forces but wills, and what are wills but forces seeking self-furtherance? But immediately, forgetting this involuntary and illogical appeal to science as a descriptive and true portrait of nature, Schopenhauer returns to his doctrine that natural science and theoretical philosophy only depict our personal perspective upon nature, which is determined by our private character and needs.

Thus the will, after all, although it is noumenal or real, provides no knowledge but only useful illusion—useful to the amoral, wholly egoistic will-to-live, which seeks its own furtherance against all other wills. This skeptical conclusion expresses the profound pessimism which is rightly attributed to Schopenhauer and which was widely inculcated by his writings. But Schopenhauer himself seeks to transcend this skepticism and pessimism. We have, he says, a third faculty, one

traditions spring from vacillation with respect to natural science. Science is sometimes abruptly rejected as error, sometimes used to establish Schopenhauer's own doctrine. These inconsistencies might be overcome, perhaps, if we allowed biological science, rather than physical theory, to represent natural science. Schopenhauer, like Kant, identifies natural science with physical science; but his emphasis upon the will-to-survive, upon specific form, and upon the individual's self-sacrifice to the needs of its species suggests the initial step toward a new approach to natural process. The complete removal of Schopenhauer's contradictions, however, would be effected only by a study explaining the essential and fundamental role of aesthetic apprehension in all science, physics as well as biology—it would require, that is to say, the successful rewriting of Kant's third *Critique*.

Schopenhauer's writings helped to propagate the voluntarism, the anti-intellectual pragmatism, and the vague aestheticism which ran under the surface of nineteenth-century thought, to erupt in explicit and extreme forms in our own century. Like Fichte, Hegel, and Marx, Schopenhauer helped to widen a growing disruption in the modern mind. Fichte set philosophy against science; Hegel set people against people; Marx set class against class; and Schopenhauer now sets art against science, and the will-to-live against the disinterested intellect. What was the source of this unhappy division of the human mind against itself? A fatal malcontent inspires these philosophies. In the cases of Fichte and Hegel, this malaise comes to light only in the destructive political results of their teaching; but in Schopenhauer, it is conscious and explicit. From this world, with its unholy struggle for survival and power, he intimates, we find release only in complete abnegation of the will-to-live, *i.e.* in death. Even more strange, from the pen of this worldly cosmopolitan aesthete, is the intimation that salvation lies in the sacrifice of the individual for his kind, which is a sort of atonement for the sin that is the world. The other-

From this subjectivistic fantasy he advanced to a legalistic or metaphysical stage, in which absolute principles or "laws" were supposed to rule over nature. Today, at last, men recognize the subjectivism of these philosophies which seek vainly to penetrate through appearances to "reality." Men now accept sensible appearances, or phenomena, as the sum of knowledge, and seek only to classify the regular sequences observable among phenomena. Awareness of such uniformities permits calculated prediction, giving to man some control over natural occurrence; and with ultimate knowledge he may now dispense. This is Comte's *positivism*.

In truth, this modest and empirical estimate of human knowledge is largely window dressing, intended to attract the scientific mind and to make formal renunciation of the older and now discredited scholastic metaphysics. Comte's positivism is really supported by unconscious metaphysical assumptions. This metaphysical framework makes its appearance as a classification of the sciences. The sciences naturally fall, Comte points out, into a definite sequence, proceeding from the mathematical sciences, through the physical and biological sciences, to the sciences which deal with man and society. The sciences antecedent in this order are presupposed in and instrumental to those which follow; and the sciences accordingly culminate in sociology, which telescopes into its theory all the principles of the other sciences. Because of this relationship, the sciences become more complex and difficult as we proceed in this order, from mathematics to sociology; and this is why they were historically developed in this order. Comte regarded himself as the originator of empirical sociology. He may have invented the name; but his social analysis is less empirical and scientific than that of many of his predecessors.

As we have seen, this "order of the sciences" reflects primarily the fact of natural evolution on this planet. Comte was no evolutionist. For him, consequently, the order of the sciences constituted an ultimate metaphysical fact, not to be empirically

"social statics" and "social dynamics." In physical science this division into statics and dynamics has meaning. Physical statics deals with stresses in bodies at rest, whereas physical dynamics is the study of bodies in motion; and the two disciplines apply the same basic principles to two sorts of physical situation. This distinction cannot be simply translated to sociology. What Comte calls "social statics" is a study modeled on physical dynamics. It seeks a social theory defining the constants always and everywhere conserved through social change. What he calls "social dynamics" is really an historical study of human progress, in no way analogous to physical dynamics. This error is worth noting, because it makes unusually explicit the long confusion which has obscured our conceptions of social and natural evolution. Comte correctly distinguishes the historical study of human progress from the theoretical study which defines the social structure which is supposedly preserved throughout this evolution; but he incorrectly conceives of these two studies, respectively historical and theoretical, as the two halves of a single theoretical science analogous with theoretical physics. This is only another version of the error committed by Hegel in his dialectic. The dialectic "progresses" from a beginning to an end, like a history or an evolution; yet it claims to be a theoretical system, defining the unchanging and absolute structure of the world. We will return to this problem in our study of evolutionary doctrine.

We have already mentioned Comte's outline of man's intellectual evolution as proceeding through three stages, from animistic mythology through metaphysical speculation to positivistic science. His elaboration of this doctrine is suggestive; it is, in fact, the prototype of the social dialectic of Marx. Each stage, Comte says, produces its characteristic social institutions. The earliest theological stage is marked by the development of ecclesiastical and military institutions; the metaphysical stage is characterized by the establishment of constitutional governments and of legalistic forms of social control. We still

Herbert Spencer (1820–1903) exhibits this same failure. Spencer was long regarded in English-speaking countries as the chief philosophical exponent of evolutionary doctrine. In truth he belongs to the early nineteenth century, with Hegel and Comte, in his explanation of evolutionary facts in terms of nonevolutionary principles. His extensive system, elaborated in a small library of volumes the writing of which occupied his long life, reveals his dogmatic and unempirical method, which resembles that of Hegel in its mechanical imposition of a verbal formula upon the diverse materials provided by the special sciences. He is like Comte, however, in his ostensible repudiation of metaphysics. He prefaces his system with a call to agnosticism, warning us not to pursue knowledge of the “Absolute,” which is beyond human comprehension. We are limited to knowledge of phenomena and their uniformities. But having thus eliminated the word “absolute,” Spencer turns to the construction of a universalistic metaphysics which is absolutistic in all but name, and which closely parallels the dialectical metaphysics. There are, he says, a number of a priori and absolute principles involved in our recognition of “phenomena”; and the most important of these is the principle of necessary development, according to which matter proceeds to its spatial reorganization by an inherent necessity, from the most simple physical patterns to increasingly complex inorganic, organic, and psychological patterns. The sciences, arranged in their proper order, exhibit the successive stages of this material development of nature; and all Spencer need do, or does, is to present the many concepts of inorganic, organic, and human science as arising from this “necessity,” under which “matter” labors, progressively to complicate its spatial pattern. It need scarcely be pointed out that this Spencerian “matter” corresponds in no way to what modern science has understood by this word. The reader will perceive Spencer’s revival here of the Aristotelian and scholastic concept of matter, which was defined as the potentiality to realize form; but the

application of a more general ethical theory; and in his ethical writings, Mill remained vacillating and inconclusive. He was not satisfied with the utilitarianism of his father and Bentham; yet he seriously considered no alternative, and his effort to modify its hedonistic axioms only left them meaningless and inapplicable. Pleasure is the objective of every human act, he hedonistically agreed, and the good is therefore to be defined by a hedonistic calculus, correctly calculating the maximum sum of accessible pleasures. He insisted, however, that pleasures must be estimated qualitatively, as well as quantitatively. Mill, and after him other hedonists, never clearly perceived that a rational calculation of pleasures—and still more, of course, a qualitative estimate of pleasures as higher or lower—appeals to ethical criteria lying beyond the immediate feeling of pleasure. Assuming that pleasure is the object of an instinctive and rightful urge, how shall man direct and control this instinctive pursuit of pleasure, to gain from it its optimum outcome? Even to ask this question involves the postulation of some intellectual ethical criterion over and above that of pleasurable-ness.

A similar vacillation appears in his political writings. Mill supported the consequences which flow from the principle of inalienable rights; yet he feared what might result from the full application of this principle. His defense of minorities, for example, was motivated by his fear that an electoral majority might oppress minorities. Such half-hearted allegiance to democratic principles did not strengthen liberalism. British liberalism was largely a creation of the antimonarchical but still aristocratic Whig party, which supported an extension of political suffrage to gain popular support against the Tory opposition. A genuine liberalism (and we should not let the inadequacies of earlier liberals rob us of this word) is established upon faith in the individual man, and is incompatible with fear of "the masses" and with the very concept of "the masses." Liberalism is our faith that the individual human being is good,

the scientific analysis which is auxiliary to hypothesis. The true method of science is the creation of hypotheses; and this eludes definition.

Our justification for applying a generalization from past facts to facts as yet unobserved, Mill says, rests upon the largest generalization, which is derived from the sum total of past generalizations. Having made many successful inductions in special fields, we now make a general induction, stating that nature is evidently amenable to inductive study. This largest generalization Mill calls "the principle of the uniformity of nature." It was immediately pointed out that this reasoning is circular. The specific inductions are "successful" only if we grant their necessary applicability to unobserved fact, and this is what needs proof. What proof is there that nature is uniform?

Mill's teaching may be summarized as follows: Our only problem, he assumes, is to distinguish genuinely causal sequences from merely casual or chance repetitions. The *method of agreement* compares an observed sequence with earlier observed sequences. The *method of difference* instructs us, if *abc* has always been followed by *def*, to see whether the absence of *f* in the consequent does not entail the absence of *c* in the antecedent, in which case *c* is presumably the cause of *f*. The *method of residues* says that if *abc* is the uniform antecedent of *def*, and *ab* the uniform antecedent of *de*, then, once more, *c* is the cause of *f*. And the *method of concomitant variations* tells us that where one factor varies quantitatively with another, the two factors are probably causally connected. The occasional admiration of a scientist for these trivial definitions of "scientific method" reminds one of the surprise and pleasure of Monsieur Jourdain, when he was assured by his tutor that he was able to speak in prose, and indeed always did so speak. If this is scientific method, then who is not a Newton? "Inductive logic" has cheapened our estimate of science; and those who would have science receive the intelligent respect which is its due should protest this abuse in no uncertain terms.

Aristotelian metaphysics, as this was perpetuated in the scholastic theology and philosophy. These modern thinkers believed themselves to be rejecting all metaphysical speculation when they emphatically rejected the scholastic metaphysics; yet they unconsciously introduced new metaphysics of their own. Their own metaphysics they disguised as a "method." They were unaware that every method, if it is advanced as universal in its applicability and authoritative in its results, implies certain absolute assumptions which provide the generative nucleus of a body of metaphysical doctrine. Descartes and Spinoza, who initiated the most extreme rationalism the western world has seen, conceived themselves to be free from metaphysical assumptions and to be advocating only a "method." But similarly the nominalists and empiricists, who rejected the Cartesian along with the scholastic metaphysics, were the proponents of a metaphysical view, resting upon absolute axioms, but disguised as only scientific method. *Nominalism asserts the absolute and ultimate reality of individual being, as observed in particular things and occurrences; and this is a metaphysical affirmation. Empiricism likewise, although it allows only probability to its general statements, makes observed particular fact the ultimate and sufficient criterion of truth; and this is to subscribe to the nominalistic axiom. But it has never been perceived with sufficient clarity that the empirical realism which is modern science, like the rationalistic realism which was Greek science, constitutes a metaphysics. We need not wonder at the growing confusion of empirical thinkers who were not aware of their own first principles, presupposed in all their method.*

As empirical thought bogged down into confusion and triviality, there inevitably appeared a reaction against it, and a new appreciation of the clarity and forthrightness of rationalistic thinkers who openly confessed to their metaphysical postulates. We cannot follow nineteenth-century thought through all of its many movements; but we may note its

knowledge of universal natural principles, is not invalidated by criticism of his atomistic psychology. But Green assumed that his discovery of flaws unessential to Hume's central argument invalidated Hume's whole conclusion; and he returns with a leap to an absolute, universalistic, and idealistic metaphysics. Because the elements of experience are not isolated atoms, he concludes that a perfected experience contains no separations, no fragmentary character, no elements of any sort. The whole of experience, he claims, is somehow inherent in every part of experience. The whole mind, with its whole knowledge, informs our every judgment. Yet having so argued, Green must retreat in order to acknowledge the limitations of human knowledge, the lapses of mind, the lacunae and errors of human experience. It is not your or my imperfect mind, he allows, which has this perfect organization and this transparent wholeness and unity. But such is Absolute Mind, of which our minds are imperfect and fragmentary parts, and of which all fact is the infinite and unified content. Similarly, our particular actions and our individual wills are the real modes of a universal, eternal, and absolute Will. Reality is an organized Whole; and in organized human society we intend, so far as our limited and modal nature allows, a proper subjection of our individual will to the absolute Will which is God.

The two most notable British exponents of absolute idealism were Bradley and Bosanquet. *Francis H. Bradley* (1846-1924) was the profounder of the two. Because he probed deep, he brought again to the surface of thought the insoluble problems which Kant had acknowledged and clearly marked, but which Kant's absolutistic successors had overridden. Bradley resurrects, and remains inextricably caught in, those antinomies or self-contradictions which Kant had shown to be latent in absolute and universal metaphysics. How, Bradley inquires, can the limited human mind, analyzing a finite experience, hope to establish principles of universal and eternal validity? If Reality, as absolute idealism implies, is an organic Whole, to

now a whale." If we err, and say, "The whale is a fish," when better acquaintance would classify it as a mammal, our error is one of extent, not of intent. Wider experience would classify the whale as a mammal; but in the context of a narrower experience, the whale is truly a fish. Bosanquet is insisting here that our knowledge of nature is in sort geographical, and that the extension of science by new and often strange hypotheses does not really discredit the older and narrower hypotheses which are displaced. It *was* true that the sun moves round the earth; it *is* true that the earth moves round the sun. Some such view, apparently self-contradictory, is implied in every absolute and nonempirical realism; for this doctrine ultimately requires the literal identity of ideas with things.

Idealistic philosophers made use of a distinction between *external and internal relations*. If the relations discovered by the intellect are "external" to the things related, then some of the relations of a thing may be correctly known even while we are ignorant of others. Thus you may know that your friend has an older brother, but be unaware that he has a younger sister. If all relations are "internal," however, then real acquaintance with anything, *i.e.* knowledge of its character, includes knowledge of all its relations. Knowing your friend, you know he has a sister. It is clear, perhaps, that for common sense and empirical science, the distinction between external and internal relations cannot be ultimate. We proceed as if relations were external, discovering now this and now that causal or other connection, as best we can. It is in the light of these causal relations, however, that we progressively define the character of a thing, so that the relations which initially were external are finally internal. Thus we study a salt, discern its color, its specific crystalline form, etc.; but we fail to determine from these data its solubility. We discover by experiment that it dissolves in any acid; and from this "external" relationship we learn something of its internal constitution, so that the relation becomes "internal." The absolute idealist holds all rela-

ingly than any of his critics the inherent weakness of absolute idealism. But discussion of this new realism belongs to our review of contemporary thought.

Looking back over this summary of nineteenth-century philosophy, we find little that is important and philosophically new. The thinker rings the changes of eighteenth-century thought, usually with less vitality than his more creative predecessors. Where reflection starts from Kant, there is a fatal development of "Neo-Fichteans," "Neo-Schellings," and "Neo-Hegelians." Where the thinker starts from Hume, he may either be led to discover Kant, or flounder into a verbal positivism that really returns to a rationalistic metaphysics disguised as an absolutistic "methodology." There were at least two good reasons for this intellectual failure. The first was that the problem which faced this age baffled the inquirer. Mathematical physics, loyal to the mechanical principles of the Newtonian physics, seemed to indicate the dependence of science upon absolute mathematical axioms; and this discouraged a radical and consistent empiricism; yet, on the other hand, science everywhere, no less in physical inquiry than elsewhere, proceeded from observed data to large hypothesis, and in this way affirmed its empirical faith in the ultimacy of particular fact. The nineteenth century lacked the data allowing escape from this deadlock; and the profoundest and only completely honest thinkers were, perhaps, those who saw this problem as Kant had seen it, and accepted Kant's phenomenalism or positivism with respect to natural knowledge, and his noumenalism or moral realism with respect to action. Fortunately the twentieth century was to provide the data freeing human thought from this impasse.

The other reason for the failure of philosophical genius was the shift of public interest from philosophy to science, and, after the mid-century, to the mind-shattering hypothesis of evolution. It was in empirical inquiry that the genius of the nineteenth century exhibited its power. Never had there been

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22 THE CONCEPT OF EVOLUTION IN SCIENCE AND PHILOSOPHY

IN ANTIQUITY, ANAXIMANDER AND EMPEDOCLES advanced evolutionary hypotheses which were evidently based upon study of the organic species. Early Greek science was as much concerned to understand the generation or evolution of nature as to learn something of the permanent structure of nature. Science was usually presented, indeed, as an inquiry into the *physis*, i.e. into the coming-to-be or generation of nature. Today the word "physical" carries no such evolutionary connotation, and this change of meaning testified to a radical change of interest and outlook. Perhaps by Pythagoras, certainly by Parmenides and Plato, scientific interest was focused upon the constant structure or morphology of nature and the historical or evolutionary character of nature henceforth neglected. This neglect of natural history was required by the ever clearer distinction of theoretical or systematic knowledge from more casual knowledge, which did its aim at theoretical unity; and it was encouraged by the increasing dependence of analysis upon mathematical theory. In other words, the development of mathematical physics prevented the development of a science centered upon biological

appreciation finally became explicit in the concept of human progress. Although given a name only in the late eighteenth century, the concept of progress underlay and supported the whole development of modern science and society. Science was conceived to be the intellectual wedge which opened the way to political and other progress; and no institution nor system has yet been able to rob modern man of this optimistic outlook upon an expanding and progressive future.

But it was seldom seen, and it still is inadequately understood, that this conception of human progress commits us to a temporalistic or historical conception of nature at large. Quite illogically—if by “law” we refer to the fixed and definable principles of nature—men spoke of a “law of progress.” By an inherent natural necessity, said the first advocates of progress, man has continuously progressed in wisdom, goodness, and power. This is, of course, untrue. Human decline is unfortunately as evident as human progress; and it is clear that progress depends first upon the human will to progress, and ultimately upon a number of factors into the nature of which we would do well to inquire.

The philosophical systems elaborated during the late eighteenth and early nineteenth century show a curious half-awareness of history, a sort of effort to accept, without explicitly acknowledging, their mental orientation upon historical and evolutionary fact. We have seen how the post-Kantian dialecticians, and the systems of Comte and Spencer, tried to do justice to the largest consequences of natural evolution without accepting the hypothesis of evolution itself. And, in a deeper manner, the whole development of thought from Hume to Kant onwards prepared the way for an evolutionary view of nature. Both Hume and Kant made time, not space, the widest and most ultimate category of knowledge. Reality, this we win, mean, is in the last resort a linear, progressive sort of thing. But although these two thinkers were somewhat sceptical concerning theoretical knowledge, they did not explicitly acknowledge

This Aristotelian doctrine, either directly or through its incorporation into Platonism, soon elevated the fixity of species into a primary dogma of the human intellect.

For ourselves, recently emancipated from this dogma, even a cursory study of the species of plant and animal life points to the fact of organic evolution. Why else should the species fall into a natural classification which takes on the form of a genealogical tree? By the close of the eighteenth century, there was ample and conclusive evidence for the hypothesis of geologic and organic evolution. Yet the hypothesis was stoutly resisted or even contemptuously dismissed, often by sincere and competent scientists. These irreconcilables felt, obscurely but correctly, that the evolutionary hypothesis contravened certain fundamental assumptions accepted by earlier science; and they feared that it would discredit the whole achievement of science, and invalidate its method. So they rebuked or ignored Lamarck, who first gathered the evidence for evolution into a unified and really conclusive argument. Condemnation of the Lamarckian hypothesis was the easier, because Lamarck gave to his exposition an Aristotelian and vitalistic interpretation. The mutation of species, he said, is the consequence or manifestation of a vital force inherent in the organism, which in its pursuit of existence may develop new characters transmitted to its progeny. The biologist rejected this view, because it implied that organic changes are self-caused. This would violate the principle basic to mechanistic causal analysis, which holds all change to be reaction to some external action or condition.

Half a century later, in 1859, the scientific world generally applauded the publication of Charles Darwin's *Origin of Species*, although there persisted some minor opposition to its teaching. During the interval between Lamarck and Darwin, geologists like Lyell and Hutton had familiarized scientists with the evidence provided by fossil remains of the progressive evolution of the earth's surface. Darwin used this geological

velopment was distinguished by its emphatic affirmation of the reality of individual being and the ultimacy of particular fact, and by its opposition to a rationalism which affirmed the reality of universal being and the absoluteness of universal principles. To say that individual being is real is to say that individual being is effective, or truly and finally determinative of what happens in the world. And to say that universals are abstractions is to say that universal being is ineffective, unreal, fictitious. But the structural principles, supposedly effective in keeping species fixed, were universal principles, definitive somehow of universal being; and if there is no universal being, the structural principles are not effective, and we know of nothing which might fixate the species and types of things. To be consistent, we must attribute this mutability of specific form also to inorganic nature. We cannot conceive of organic evolution taking place in a nonevolving cosmos. Yet against all this reasoning is the argument that science, even an historical or evolutionary science, seems to depend upon the affirmation of constants, structural principles, theoretical formulations—in a word some form and some degree of realistic rationalism. A nature that is exclusively individual, wholly unspecific, and incorrigibly fluent could never, it would seem, be known nor intellectually understood.

We will engage this problem in our concluding chapter. Now we turn to certain philosophical speculations which are important not for their solution of the problem, but for their growing recognition of it, and for their oversharpened statement of it.

Only in the closing decade of the nineteenth century do we find thinkers who perceived the more radical implications of evolutionary science. One of the first of these was Nietzsche. *Friedrich Nietzsche* (1844–1900) is in ill repute today, at least in democratic society; for he was the proponent of the doctrine of the *superman*, a doctrine which undoubtedly helped to inspire the creators of Nazi Germany. It might be argued that

But he gives the doctrine an evolutionary twist, in that he portrays the heroic and aristocratic individual as the protagonist of a new mutation of the human species, bringing into existence the "superman." We remember how Schopenhauer depicted sexual passion as the involuntary servitude of the individual to the ends of the species. Now Nietzsche, a generation after Darwin, suggests that the amoral "hero" enthrones himself in order to establish a new species, and to fulfil the design of a cosmic evolution.

To understand Nietzsche's error, we should appreciate his half-truth. He is telling us that the will of man is the dynamo of his creative evolution, productive of new and higher forms of existence. Moral insight, like scientific insight, must break through and progressively widen the formulated codes of the past. Morality too must evolve. We may forgive Nietzsche his indictment of Christian civilization and his caricature of Christian morality, when we learn what a flaccid, formalized, sepulchral "Christianity" surrounded the boy Nietzsche in his father's parsonage. We can also understand Nietzsche when he sanctifies only one virtue, that of courage; for courage is most needed by those who would themselves pursue and in others arouse a living faith. What we cannot excuse in Nietzsche is his moral snobbishness, his contempt for humanity. Stupid provincialism, from which in his superficial cosmopolitanism he fled, still blinded him to all but an obscure Greek episode of the human past. He had no large prospect upon man's moral progress. Nietzsche, an obscure and lonely neurotic, spent his last years in an asylum for the mentally diseased. That did not prevent the propagation of his equivocal gospel, which was couched in as luminous a prose as the German language has produced. Symptomatic of a mind diseased, perhaps, was the cult which looked to Nietzsche for its medicine.

Nietzsche's doctrine is philosophically noteworthy for its affirmation of radical discontinuity in nature. Human progress, it implies, proceeds by inexplicable leaps from an older pattern

tionary, genetic, historical form of knowledge. The transcendentalism to which Fichte and Hegel gave a rationalistic form, and to which Schopenhauer gave an aesthetic formulation, becomes in Nietzsche a sheer anti-intellectualism, a voluntarism unmediated and unmoderated by anything whatsoever. The will, void of scruple and intelligible direction, must carve its destiny. It is this sheer voluntarism, this abandonment to the paroxysm of action, which became the false strength and deeper weakness of Germany. Blind to the world about it, Germany refused all adjustment to its environment, and gave to its neighbors the alternatives of destroying, or being destroyed by, a people gone berserk. Nietzsche might have learned from the Greeks that whom the gods would destroy they first make mad. There is moral sanity, one and the same forever.

A curious doctrine of Nietzsche's, but one which casts light upon his limitations, is his revival of the Greek cyclicism. Everything that happens, he wrote, is the fatal return of what has already transpired an infinite number of times; and it is the mark of the heroic superman that he can contemplate this eternal recurrence without losing his reason. In this fantasy we see a contradictory return to the eternalistic and universalistic outlook which in his main doctrine he emphatically renounces. He intimates, that is to say, that the new insight of the "superman" is just that comprehension of all time and space which Plato had accorded to the reason.

Henri Bergson (1859-1941) is a philosopher of evolution who has seized the other horn of the dilemma presented by the fact of evolution. If we agree that nature radically evolves, so that even the most basic structures of nature are subject to temporal change, shall we suppose with Nietzsche that nature jumps by a transcendental act from one structural block in the moving evolution to another; or shall we, as Bergson advises, make no appeal to structural knowledge, but try instead to understand the evolutionary progress as sheer motion, or

tiality for art. Torn in his youth between poetry and philosophy, he made philosophy his career; but he allowed to poetry its revenge, in that he used philosophical analysis to discredit theoretical knowledge in the interest of art and aesthetic intuition.

This invidious teaching was not without antecedents in post-Kantian philosophy, which was now widespread. Bergson gives to the post-Kantian criticism of science, especially to the pragmatic positivism first enunciated by Schopenhauer, a new and incisive formulation. The theoretical intellect, he writes, is not a cognitive faculty motivated by a desire to know nature and intent upon a faithful description of nature. The theoretical intellect serves practical ends. It developed as an agency of survival, and its function is to provide some practical control of our environment. Nature is incorrigibly individual, its every item is unique and incomparable; but the theoretical intellect grasps only those aspects of fact which recur again and again, and in the recurrence or prevention of which we are vitally interested. Bergson suggests, indeed, that the intellect does not so much discover these constant or recurrent characters within nature as construct them and project them into nature, thereby obscuring the true individual pattern of natural occurrence. Theoretical knowledge, he concludes, really tells us only about our own organic needs. It is incorrigibly subjective and deceptive.

Something like this conclusion had been implicit in modern philosophy ever since Hume and Kant attempted to explain how knowledge arises as the result of mental process. Bergson's study of this constructive process is unusually penetrating. Earlier epistemology, he points out, had confused the category of time with one of the three dimensions of space. Time was conceived as a linear order of instants, by analogy with space which was conceived to be a three-dimensional order of positions. But in truth no such homology or similarity exists between time and space, because time is irreversible. Time is every-

continuous change. Mathematical science is today equipped to deal with the fact of continuity—it is able to define the continuous line, surface, volume, motion, change. It is only this mathematical grasp of continuity, indeed, that allows us to appreciate and to describe exactly what is discontinuous in nature. Yet Bergson tells us that natural science replaces the continuous evolution of nature by a calculating machine, made up of jointed parts which creak and jerk in a mimicry of nature that is caricature or satire, not truth. It is because he caricatures theoretical science that Bergson must prefer art to science, which is truly the greatest of human arts.

Bergson's studies are rich in incidental insights. In his thoughtful *Matter and Memory* he compares the intellect to a grid, which allows to enter our minds only those elements of "pure perception" which are practically relevant to our vital needs in responding to the given situation. Because the mind automatically preserves in memory every past perception, this grid must suppress those memories which are irrelevant to the present situation. Thus the intellect acts as mediator between the inexhaustible materials of "pure perception" and our similarly inexhaustible personal memory. Science arises at the intersection of environmental geography and personal history. This conception, although unnecessarily subjectivistic, suggests its own expansion in a new understanding of the relationship between time and space. Bergson, it seems, would emancipate both "pure perception" and memory from the intellectual grid; and Proust, Joyce, and other "stream of consciousness" novelists inspired by Bergson show us the consequence of this emancipation in an art which, whatever its surface iridescence, seems to lack purpose and plot.

Bergson's best-known work is his *Creative Evolution*, a metaphysical study of the facts of organic evolution. This study is prejudiced by Bergson's earlier dismissal of theoretical science as a perjured and deceptive account of physical nature; for Bergson cannot now do justice to the causal connection

every creative hypothesis. Bergson identifies science with the scientific formulas generated by the creative scientific mind, formulas which any mediocre mind can memorize and mechanically apply. This error may in its turn have been due to Bergson's narrow conception of intuition, which he identified with perception. We need not suppose that immediate perception is our whole intuition of truth, and that we possess, in addition to this perceptual faculty, only a power of verbal classification and abstraction. Knowledge is advanced by large intuition suggesting new hypothesis, this latter being the source of all descriptive theory. Somehow we must rehabilitate our real faculty of cognition, the true and creative "intuition" which is the generator of all science and all true art.

In his ripest study, *The Two Sources of Morality and Religion*, Bergson is more sober. He finds two distinct factors working in social evolution. One is the moral insight which has inspired the great teachers and prophets; the other is the codes and institutions which preserve and apply these prophetic insights. His fantastic proposal to synthesize the instinct of insects with the theoretical intellect now reappears in the wise proposal that we should deliberately bring a critical moral insight to bear upon our social institutions, continuously reforming and ultimately transforming these. So the most brilliant Jewish thinker of his century would once again reconcile the law with the prophets, and fulfil the law in an ampler justice.

As the Nazis exploited Nietzsche, so the teachings of Bergson have been exploited by reactionary political opportunists, who read into his intuitionism the justification of a violent *activisme*, and who use his pragmatism to justify the abuse of institutional mechanisms and orthodox loyalties. Much as the Greek sophists prostituted the critical method of Greek science, by transforming it into a cheap and scurrilous diatribe against "convention" and morality, so these modern sensationalists have cheapened the modern criticism of science, by converting it into an apology for amorality and social violence.

his estimate of history, however, Croce is misled by his subjective idealism, which does not allow him to distinguish history as it occurred in the past from history as it is recovered by the present mind. He is misled also by his expressionism, which holds every product of mental activity, including written history, to be only an expression of the mind which produced it. So Croce tells us that the materials of history, *i.e.* the data recovered by historical research, do not constitute history until they are organized, synthesized, and informed by the living mind of the historian. It is only here and now, in its actual entertainment by some mind, that the past has reality. What therefore is the past? It is a dimension of the present mind, which somehow projects its own distinctive form as "the past." Our ordinary conception of the past is in this case diametrically opposite to the truth. We think of the past as determining the present, whereas in truth the present determines the past. More correctly, history is the full realization of our present selves. The essential work of mind, *i.e.* of absolute being, is the continual reformation of its historical retrospect, and a perpetual rewriting of history.

It is questionable whether a subjectivism so extreme as Croce's does not collapse into meaninglessness. We ordinarily suppose that the documents and other data used by the historian actually preserve certain characters possessed by them when they originated. We believe that we read the very words inscribed by Caesar in his remote encampment, or dictated by Queen Elizabeth. But no, Croce tells us; your perception of the document is a present perception, is it not? And similarly your interpretation of the document is a present hypothesis? What is there here that is past? There is only your present mind, which generates that "past." But if we accept this conclusion as true and sufficient, what meaning can we give to the words "history," "the past," "yesterday," "tomorrow." Time evidently demands more objective treatment—Croce's violent embrace destroys its object.

not manifest, in its particular way, some general or even universal principle? Would it not be paradoxical if the hypothesis of evolution, which is the largest possible application of the conviction that what occurs later is the causal resultant of what existed earlier, should finally invalidate the concept of causation on which it rests?

The mechanistic concept of causation, which requires later occurrence to be exhaustively explained as the determinate effect of earlier occurrence, has been the governing principle of modern science, and it has been the anchor since time immemorial of common sense and human sanity. We can really conceive of no other sort of explanation of fact. All that has ever pretended to be another sort of explanation either collapses upon careful examination into nonsense, or reveals itself to be only a verbal disguise of mechanistic explanation. Thus philosophers long spoke of teleological explanation, by which they meant an explanation of earlier occurrence as being somehow determined by what it brought to pass later. We cannot avoid this sort of explanation in our dealings with conscious and purposive behavior. The reason or cause of a purposive act, we are wont to say, is the future effect which it intends. And so, the teleologist argued, we may suppose every occurrence, and finally the whole cosmic process, to be determined by that last supreme event which is its ultimate issue. The future explains the past; and it does this only because it determines the past, of which it is the reason or cause. But the scientist, faithful to his principle of mechanistic causation, will easily elude this argument for teleology in nature. The statement that purposive behavior is determined by the end which it seeks to realize, he will say, is elliptical. The purpose does envisage an end, and action is guided by that prospect; yet the purpose, the prospect, and the end envisaged are themselves already determinate, and determined in fact by past conditions. Purposive behavior is thus only a peculiarly complicated sort of mechanistically determined activity.

terminated at some first moment, or that everything is determined by its last issue. Hume's conclusion still stands—we know of no universal necessity in nature. Every moment is real and effective, not only the first or last moment; and the later moment is no less effective than the earlier moment.

Now the hypothesis of evolution exhibits this truth, first glimpsed by Hume, in a striking and tremendous way. We discover on this planet a progressive mutation of natural form from inorganic, through organic, to human character. There is material continuity in this progress, the inorganic matter becoming organic, and organic matter becoming human. We are required, therefore, to seek some sort of causal explanation of the progress; and it is this explanation which eludes our philosophers of evolution and drives them to speculative frenzy. Nietzsche concludes that the evolutionary mutation is inexplicable, that it is externally unconditioned, and that we can therefore mutate into anything we please. Bergson concludes that evolutionary change is explicable, but only by a sort of explanation that eludes scientific statement and that finds its expression in the symbolisms of art. Croce concludes, astonishingly, that the very distinction between past and present, upon which all causal explanation rests, must be renounced, in which case, of course, the problem disappears; but this means only that we are prohibited from asking any intelligent question concerning natural change.

One more "philosopher of evolution" will help us to grasp the nature of this problem, presented by evolutionary science. *Samuel Alexander* (born 1859) seems to have been early influenced by the dialectic of Hegel, but to have refused Hegel's idealistic epistemology. He is realistic in his acceptance of the theories of natural science; and he makes his chief concern the progress of natural evolution, especially in its movement from physical or inorganic matter toward organic form, and finally toward human intelligence.

In his chief work, which is entitled *Space, Time, and Deity*,

overreaching or indwelling Form, working upon nature and persuading it into that form "as far as necessity allows"; but the diverse forms of sensate, organic, minded, and deific nature arise spontaneously—or rather, given certain complications of the earlier form, the later form is thereby also present; and here we are reminded of Spencer, who taught that the organic and human forms of nature are nothing else than progressively complex distributions of matter. These sudden and inexplicable appearances of new forms or qualities Alexander calls "emergences," and he exhorts us to accept "with natural piety" this potentiality of matter to re-create itself in new forms. "Natural piety," it would seem, requires a moratorium on inquiry and curiosity. It is just the nature of nature, we are told, to evolve, and to evolve specifically yet unpredictably into the mineral, organic, human, and social forms which we observe. Alexander does suggest the effective and universal presence in nature of a certain "nisus," *i.e.* a tendency or direction, leading from forms of less value to forms of more value. This nisus, a sort of ghost of the Platonic Good or the Hegelian Absolute, escapes definition, and is presumably the object of a transcendental apprehension. We have here a mystical conclusion, similar to that of Bradley.

Alexander's system is valuable for its clear presentation of the problem it undertakes to solve. If we accept the analyses and results of the several theoretical sciences as a final and definitive description of nature, it is shown, then we must admit the effective presence in nature of relationships and changes which simply elude theoretical explanation. Theoretical physics defines physical structure, theoretical chemistry defines chemical structure, theoretical biology defines organic structure, theoretical psychology defines human nature, and theoretical sociology will define, as they eventuate, the activities which Alexander attributes to "deity." But no theoretical analysis will grasp the evolutionary changes which transform physical motion into chemical interaction, this into organic

plicable. And third, the doctrine of emergence only revives the discredited fallacies of rationalistic philosophy. It revives in its hypostatization of primary and secondary qualities the Cartesian dualism; but it proceeds to widen this dualism into an absolute pluralism, by adding tertiary and quaternary qualities. Yet we know of many causal relations between physical actions and organic reactions, between physiological conditions and mental processes, between individual thought and its social environment. Why should we arbitrarily insist that causal relations are intelligible when they occur *within* physical, organic, mental, and social processes, but unintelligible when they occur *between* these processes? Science cannot respect so arbitrary a distinction.

And finally, when we examine more closely this doctrine of emergentism, we discover that it is only a rather belated recognition, obscured by rationalistic prepossessions, of the truth announced by Hume. Hume showed that *no* causal connection is intelligible in the sense that the effect can be *deduced* from the cause. In all causal analysis, we finally reach types of causal sequence which just *are*, and which we must accept as the way of the world, as the basis of all scientific explanation of particular occurrences and as the source of our definitions of things. But this finality of causal connection holds of all causal connections, not only of some. If the causal effect by which a physical object stimulates in ourselves a mental perception is inexplicable and "emergent," so is the causal connection by which a physical object influences the motion of another physical object. This even the seventeenth-century Occasionalists knew. But Alexander either does not understand, or will not accept, the demonstration of Hume that all causal process whatsoever is "emergent" in its contingency. He is really a belated Cartesian, lost in an evolving world. He tells us that there are four or five absolute substances, namely physical motion, chemical matter, organic matter, mind, and society. He admits that the earlier substance produces the latter. But he rationalistically identifies science with an intuition of abso-

may insist here that we cannot legitimately accept the common conclusion of these "philosophers of evolution," who tell us that evolutionary progress is scientifically inexplicable because it eludes a purely theoretical analysis. Science is not necessarily limited to theoretical analysis; nor, as we shall show, has it ever been so limited. Science has always been more than its theoretical descriptions; and only because this is so could it arrive at and seriously entertain the hypothesis of natural evolution. Science is eternally committed, however, to the principle that all natural occurrence whatsoever is causally determinate, and therefore scientifically intelligible and explicable. If we will only hold fast to this principle of sufficient causation, which is the root of human sanity, we may come through the dark forest of intellectual confusion and know again the light of reason.

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III CONTEMPORARY PHILOSOPHY

23 REALISM

WE NOW REACH THE END OF OUR SURVEY AND approach the goal for which we undertook it, namely, an understanding of contemporary life and thought. Some of the thinkers noticed in the preceding chapter are either still living or only recently deceased; and certain of the nineteenth-century movements earlier described are still influential, although usually in somewhat modified form. Our study of these thinkers and movements accordingly already introduces us to contemporary thought. Yet there is a sense in which the twentieth century, especially the period following the First World War, has drawn a line between ourselves and earlier speculation. Contemporary philosophy makes new starts in new directions. This independent and rather revolutionary attitude affects the way in which earlier doctrines are understood and developed today; and we best appreciate the new outlook by observing those contemporary movements which are still in process of formulating their doctrines, and which bring this outlook to sharpest expression. We will consider the movements known as the new realism, pragmatism, and logical positivism; but it should be remembered that every such classification is oversimple and somewhat misleading. Today the whole pattern of traditional thought is undergoing a sort of kaleido-

metaphysical pretensions; but the idealists transformed this criticism into an invalidation of science, in the interests of a superscientific metaphysics. The scientist who is intent upon particular fact, it was urged, reaches only a tentative, conjectural, and incorrigibly partial or fragmentary knowledge; but the reflective philosopher carries the stumbling and blinkered effort of science to its true goal in an unrestricted knowledge of absolute, universal, and unitary being. Only in such absolute knowledge do we find the complete interrelationship of fact which science haltingly depicts in its empirical hypotheses. Perhaps we may agree that science does point beyond its present formulations of fact to a more inclusive knowledge. But the scientist would like to advance to this better knowledge himself, with due regard for scientific method and rigor. He is not satisfied to be told that his method is by definition incompetent, and that another "transcendental" knowledge, which he would call empty and verbal, must supersede his empirical study of fact. So science was increasingly and quite properly hostile to this philosophical transcendentalism.

Further, the political implications of this absolutistic philosophy aroused fear and distrust, especially when it became the creed of conservative opposition to a liberalism which seemed to have lost its intellectual bearings. Starting from the apparently innocuous and liberal-sounding doctrine of individual self-realization, the absolutist could portray this self-realization as a movement by which the individual person ultimately identifies himself with Absolute Reality, the One or All, and proceed to discover the chief actualization of this Absolute in the state. This conclusion may appear farfetched; yet it is historical fact that all absolutistic political theory has grounded itself upon some form of absolutistic metaphysics.

Finally, the doctrine of metaphysical absolutism, even where it was ostensibly advanced as the theological bastion of religion, repelled many a religious mind and probably contravened the creeds of most religious confessions. Christianity especially

ism, and other movements which hold that the mind in some way constructs and in some degree generates its cognized objects. The doctrine is indeed realistic in its insistence upon the identity of cognized objects—qualities, things, relationships—with reality itself. Yet the name “realism” is not very helpful to our appreciation of its distinctive teaching. Medieval scholasticism was realistic when it taught that the reason intuites the true essences or specific forms of things. Nominalism was realistic in respect to sensed fact, if it insisted that our immediate perceptions of particular character, but not our abstract conceptions, infallibly apprehend reality. And absolute idealism in Hegel or Bosanquet was realistic when it accorded to the concepts generated by transcendental reflection an absolute validity and an identity of some kind with universal being. The idealistic postulate of absolute idealism, affirming the identity of Reality with Mind, was used to establish the realistic postulate that the objects constructed by mind may have the status of absolute reality. In what, then, did this new realism distinguish itself from older forms of realism? Wherein was it more realistic than these other doctrines? The new realism distinguished itself from earlier realism in two ways. First, it was impartial with respect to the realistic claims of perception and conception, or the senses and the intellect. Both, it held, may directly and truly apprehend real being of some sort. Secondly, it was unusually clear and outspoken concerning the nature of such cognition. The perceived or conceived object, it said, enters the mind without alteration of any kind, without shadow of change. Cognition differs from many processes known to us, in that the cognized object is unaffected by its mental context, or by the process of becoming cognized. The object as it is apprehended is exactly what it was before it was apprehended, and what it will be after it is out of mind again.

A primary intention of this doctrine was to protect scientific knowledge from the various kinds of criticism it had undergone since Berkeley and Hume. If both perception and con-

proponent of contemporary realism, is *Bertrand Russell* (born 1872). Russell in his successive writings has attempted such diverse approaches to the problem of knowledge, and reached so various and tentative conclusions, that a résumé of his teaching is scarcely possible. Noticeable is his distinction, both in his earliest and in his latest writings, of two domains of "real" knowledge, *i.e.* of absolute and necessary judgments. One of these is the perceptual domain of sensed quality. We indubitably perceive colors, shades of the "same" color, and relationship among colors. Orange is *necessarily* placed between red and yellow. Here is the domain of indubitable, immediately apprehended fact which provides the material—not only in its qualities but also in its relationships—for all conceptual knowledge. The other domain is that of logical and conceptual objects, *e.g.* mathematical entities. Here also we have immediate and indubitable insight. The problem is to see how these two domains of absolute knowledge, which appear in many ways incommensurable, conspire to give us the hypothetical or probable knowledge which is empirical science. Russell attacks this problem again and again, but never claims that he has solved it.

Russell's lasting fame, which will increase as the centuries pass, depends less on these inconclusive epistemological studies than on his reform of logic, to which we referred in our study of Kant. For more than two thousand years, logic had remained much what Aristotle left it—a study of sentences of the form *A is B* (all *A is B*, some *A is B*, no *A is B*, some *A is not B*) and of syllogisms composed of pairs of such sentences and their implications (no *A is B*, some *C is A*, so some *C is not B*). Philosophically minded logicians had produced large tomes which elaborated this primitive logic as a basic definition of the "laws of thought," and discussed with some acumen and vast labor its relationship to factual material and ultimate being. But modern science had long since forgotten this Aristotelian logic, and developed its own ways of thought and intellectual

the logic of the future. It transformed the discipline of logic, vastly extended it, and made possible a new understanding of the nature of logic and of its relation to empirical knowledge and to fact.

This revolution was not the work of a day, nor yet of two men. Russell leaned heavily on the contributions of earlier mathematicians and logicians, such as Leibniz, Frege, Peano, and Boole; but he consolidated and developed these earlier studies, and, above all, he made the intellectual world aware of them and their significance. The *Principia Mathematica* formally announced the close of one long era of intellectual development, and the inauguration of a new philosophical era, in which the inquiring human intellect casts loose from certain fixed moorings to which it had earlier been anchored. Henceforth the thought of man must sail the open sea and find, instead of the old landmarks, stars by which to navigate its course.

This prospect which is opened up by the *Principia Mathematica* we shall discuss later. Here we take note only of the contribution of this work to logic. The authors show conclusively enough that the propositions of pure mathematics can be restated without loss of cogency in strictly logical terms. Mathematical theory becomes a compact but tremendous symbolic system, the purely logical character of which can be made explicit by a meticulous and rather tedious process of analysis and symbol definition. The forms and operations of thought, it follows, are not to be identified with the rudimentary code sanctified by traditional logic. They are at least as many, as various, as flexible, and as capable of development as are the operations and symbolizations of a creative mathematical science.

Russell undertook this inquiry into logical form in the interests of realistic philosophy. It was, he assured the writer, expressly to undercut and to discredit the assumptions of Kant concerning mathematics, that he proceeded to this laborious

that they are firmly adhered to. We can define meanings and symbols as we please, and uphold our definitions by fiat—for example, in a dictionary the authority of which we enforce. On the other hand, there are synthetic or descriptive propositions which make statements about things and natural processes; and these propositions, based upon our limited perception and our partial understanding of nature, are subject to change. These propositions are less than absolute, being only probable in their truth. As Hume had shown, we have no absolute or certain knowledge of matters of fact. The absolute certainty of a proposition is sufficient evidence of its purely logical and nondescriptive character.

Mathematical science, ever since the time of Pythagoras and Plato, had seemed to constitute a knowledge at once absolute and certain in its truth, and universally descriptive in its applicability to nature; and the existence of this mathematical science had seemed to demonstrate the possession by man of a rational faculty able to reach such absolute and universal knowledge of fact. The reduction of mathematical propositions to symbolic definitions ended this long error, by sharply demarcating the sphere of free or arbitrary logical construction from that of scientific hypothesis; and it thus ended, presumably for perpetuity, the era of rationalistic metaphysics. However, this clear demarcation of the fields of logic and science does not solve, but only makes more acute and definable, the problem of the relation between freely constructed symbolic systems, such as mathematical theory, and the descriptive theories of empirical science, within which mathematical theory is somehow incorporated. Does physical science, for example, with its intimate dependence upon mathematical theory, endow this incorporated logic with descriptive meaning and truth, and show the commensurability of pure logic with material fact? Or does our awareness of this purely logical structure in physical science warn us that physical theory is a human construction, which may not be accepted as the sheer description of an

himself. The human individual lives as a member of society, in the political government of which he necessarily participates; and his responsibility is not limited to an abstention from injury to others. His political power, just insofar as it is exercised, makes him the guardian of others. Inevitably, he is his brother's keeper. His right use of political power makes him the creator of other lives, his abuse of it makes him the destroyer of other lives. Moral and political responsibility therefore constitutes a positive responsibility for others' good; and our insight into what is good for others presupposes our interest in others and our love of them. An atomistic individualism, limiting individual responsibility to a negative withholding of injury from others, will not indefinitely support democratic government. This requires the positive assumption by each individual of the responsibilities of a governor of the social and moral community, within which each life is determined and by which it is shaped.

But we should be satisfied, perhaps, to leave to the future an estimate of this most important thinker of his generation, whose tremendous effect upon thought will be patent as long as intellectual curiosity impels the human mind. We will return to further consideration of Russell's influence in our treatment of contemporary positivism.

Alfred North Whitehead (born 1861), Russell's collaborator in the *Principia Mathematica*, proceeded from this same logical study to farreaching metaphysical speculations. It is interesting to observe how these two men were so differently influenced by that study, and to speculate on the reasons. Russell, trained in philosophy and favorable to the empirical British tradition, was confirmed in his suspicion that logic is an empty or "trivial" knowledge, having to do chiefly with symbols and their manipulation. Whitehead, an able and creative mathematician, was confirmed in his belief that conceptual construction is the heart or dynamo of thought itself, and was encouraged to trust to his logical talent in an attack upon the largest

allows us, therefore, to infer the relationships among nonexperienced events; and it is these we seek to define in theoretical knowledge. Such knowledge is abstract and indirect; but because our intellectual cognition is itself an occasion, directly ingredient with our immediate perceptions and, through these, indirectly ingredient with external events, natural knowledge is incorporate with its object, the external world; and this is how the Cartesian dualism of mind and matter is overcome. We are hereby assured that experience and knowledge, although not to be identified with nature, are homogeneous with nature. Experience is the stuff of which nature is made; and nature is also the stuff of which experience is made.

Whitehead's metaphysic is in many ways superior to its model, the Leibnizian monadism. It is extraordinarily versatile, flexible, competent in its interpretation of science. It is never without a philosophical answer; nor will the answer strain credulity although Whitehead's terminology may tax the memory. Leibniz needed both a *deus ex machina* to set the stage of nature, in God the Creator of the monads, and a *deus in machina*, in God the Supreme Monad. Whitehead, like Samuel Alexander, requires only a deity who works as an active and universal principle of realization, moderating and informing the careers of those who freely cooperate. For Whitehead, individual being is authentically free and indeterminate, and not predestined. Almost certainly, there never was so ingenious a metaphysical system as this of Whitehead; and not impossibly it may continue indefinitely to be just that—the last metaphysical system to end metaphysical systems.

Why has this brilliant speculative construction, so ingenious and plausible, which at so little cost saves so much—all the freedoms, all aesthetic qualities and moral values, the two criteria of science, and religion along with science—why has this genial philosophy elicited so little intellectual response, and not become the rallying point and credo of all honest and reverent intellectuals? Whitehead's vocabulary is somewhat

certainly not the old rationalism, which identified its rational intuition of eternal essence with a theoretical knowledge of the cosmic process of nature. In Whitehead's system, the essences provide only the atomic elements, out of which existent actualities are composed; and because the elements are infinite in number, they can compose into an infinite variety of existent worlds, so that the character of existent fact is contingent and must be discovered by observation. Whitehead's conception is therefore consistent with empirical method; but does it illuminate and justify, or does it on the contrary make inexplicable and dubious, an empirical theoretical science? In what sense is our science descriptive of *this* world, if its theory would equally well apply to innumerable other worlds, variously compounded of the same essences? And how can we conceive of the relation between these two realms—the intuited realm of subsistent essence, and the experienced and lived world of particular existence? Does this sort of realism ignore the real problem, which is the relation of general knowledge to particular existential fact? Does it know the creed and share the burden of a genuine empiricism, which intends to affirm the ultimacy and the intelligibility of individual being? Or does it, like Plato, leave inexplicable the relation between the actual and the ideal, and lead us toward skepticism?

Russell, although he too affirms the cognitive ultimacy of ultra-individual essences, such as are reached by an introspective epistemological analysis, is no longer inclined to give them metaphysical status, but leaves their relationship to existential reality problematic. It is questionable whether contemporary realism, in trying to save theoretical science from its critics by insisting upon the identity with "reality" of the objects described by theoretical analysis, leaves science more securely established or more exposed to rationalistic distortion or skeptical dismissal. Presupposed in all philosophical realism of this kind is the assumption, conscious or implicit, that some sort of analysis other than scientific analysis is needed to establish

hension of real objects. Cognition, in this view, has a peculiar status, and may not be treated as a merely psychological process, integrally part of the context of natural processes which are the object of cognition. The objects of cognition, Meinong taught, may or may not exist—they must include, indeed, objects which cannot possibly exist, as well as objects which do exist and objects which might exist. Thought, in a word, is something distinct from, and more extensive than, the nature which is thought about. It is essential to thought that it should be able to contemplate and define certain “objective realities,” whether or not these “realities” exist. Meinong is led to affirm the being of a realm of subsistents, *i.e.* of real and intelligibly interrelated objects which transcend the realm of existent things. This “objective” realm of essences he finds to be the basis or substance of all scientific and ethical theory.

Edmund Husserl (born 1859) has defended, elaborated, and applied a related conception in the studies known as *Phenomenology*. This name would appear to derive from Hegel’s realistic study *The Phenomenology of Mind*, which claimed that an intellectual cognition of perceptual phenomena, or appearances, discerns those universal yet “concrete” forms which are the substance of ultimate reality. (*The Real appears!*) Husserl, however, distinguishes phenomenological cognition as a peculiar sort of act, neither merely perceptual nor yet metaphysical in Hegel’s sense. For Hegel, cognition is rational and absolute because it comprehends a particular phenomenon as an integral part of the universal and absolute whole, which alone is real being. For Husserl, the absolute rational cognition grasps only its present object—a view which does not involve metaphysical assumptions of a monistic sort. Phenomenology thus belongs to the new realism in its postulation of a vast plurality of real objects, known directly and with absolute certainty by the mind. It differs from other forms of new realism in stressing that these objects are real and objective *only for a conscious subject*. As its origins suggest, it is a realism which leans toward

Most widely known of this realistic group, perhaps, is *George Santayana* (born 1863), whose mellifluous style and literary skill give to his writings an appeal apparently irresistible to the reader untrained in philosophy. Santayana's earliest realism was of a Platonic sort. In his *Life of Reason* he invited the reader to the contemplative life, in the enjoyment of an interminable play with eternal essences mathematical, physical, and aesthetic. From this Platonic heaven Santayana seems to have fallen without a parachute upon an earth inconsiderately hard and material. We live, he writes with infinitely cadenced complaint, torn between heaven and earth, and strung between the "life of reason" and a sordid "animal faith." This is Santayana's statement of the problem of the relation between the realistic essences which are open to rational cognition, and the empirical knowledge of existent fact which is obtained by way of observation and probable hypothesis. The problem itself he never directly attacks; but he unceasingly bewails it, in a poetic prose which charms, perhaps because it lulls, the philosophical neophyte.

A sturdier representative of American realism is *John Elov Boodin* (born 1860). Boodin's empirical or "functional" realism consistently avoids that dualism of essence and existence which remains the insoluble residue of more strictly realistic theories of knowledge. Boodin's primary business with epistemology, it might not unfairly be said, is to get rid of it with its apparent insolubles, in order to advance from the latest findings of the special sciences to more comprehensive and unified speculation about the world. His "functional realism" sets the mind in material interaction with its bodily setting and with the external environment, the result being that natural knowledge remains functionally corporate with its object nature, yet specifically distinct from it. This conception of functional relationship is further developed in a metaphysics of organization. The many individual and overlapping energy-systems which comprise reality reveal an unstable yet enduring hierarchical

structures defined by theoretical science to be intuited by the pure reason, the sensory perception of particular fact serving only to illustrate, not to discover, these real structures. Modern science, nominalistically influenced, has emphasized the role of perceived particular fact, which it allows to be the criterion of theoretical truth and the whole source of theoretical knowledge. The Cartesian philosophy, in its defense of theoretical science, renounced the dualism of matter and form which had made Greek realism intelligible; but it affirmed the realistic creed more emphatically than ever, by identifying the concrete being of nature with the structure defined by geometrical theory. This Cartesian realism failed, we saw, to explain the facts of time, motion, and particularity, which were earlier taken care of by the Greek concept of matter; and the empirical attack seemed in the eighteenth century to have discredited all realism. Then came the bold attempt of the post-Kantians to save realism by attributing realistic truth not to observant empirical theory, but to a "reflective" philosophical theory. These men were quite serious in their denial of cogency to empirical science, and in their excogitation of a new "philosophical science." It soon became evident to other serious men, however, that this return to realistic faith at the price of abandoning empirical science saved only the form and not the substance of that faith. Either the results of theoretical science had to be surreptitiously reestablished by the theoretical philosopher, or his "philosophical science" lacked all cogency and even meaning. And so we are brought to contemporary realism, which is a fresh effort to establish the cogency of theoretical science, by affirming again and in some new way the identity with ultimate reality of the objects defined by science.

How far does this latest effort succeed? Contemporary realism usually admits that the special theories of science are reached by hypotheses based upon a study of particular fact. The realist is empirical in his admission that the descriptive theories of science are only probable hypotheses. We have no

intellectual faith. Realism affirms the power of thought, and calls upon us to accept as truly descriptive of nature the conclusions of an intellectual study of nature. The reality which science aims to describe, however, is existent nature; and the reality which realism finally establishes is that of subsistent being, a realm of essence the relation of which to existence remains mysterious and inexplicable. We will suggest later that all realism, old or new, fails to grasp the chief motive of empirical thought, and does less than justice to the empirical science of today. The realism of science is something else than this philosophical realism.

Modern science rejected Greek and scholastic realism, we may say, because it was necessary to reject the finality of all merely general and theoretical knowledge, in order to allow the continuous progress of theoretical science in the light of new evidence. The concept of scientific progress, we shall find, requires an advance to a new and larger conception of scientific truth. But this advance cannot renounce that faith in the descriptive power of science which realism seeks to uphold. The philosophy of the future must be an enlarged realism. We may not, in order to do justice to particular fact and empirical science, renounce our faith in the descriptive truth of knowledge; yet this is what the philosophies of pragmatism and positivism, to which we now turn, would seem to require.

Notes for Further Reading

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24 PRAGMATISM

AS CONTEMPORARY REALISM IS THE CHARACTERISTIC outlook in British philosophical circles, so pragmatism has had its center and widest following in the United States of America. There have been pragmatic thinkers in Britain and Europe; but only in this country has pragmatism been a movement or school effectively propagating a common outlook and faith. And pragmatism remains, in spite of its occasional appearance elsewhere, a philosophical movement largely identified with America.

It was only in the twentieth century that American thought attempted to find for itself a distinctive vocabulary and formulation. Colonial America had preserved a motley of theological, philosophical, and moral creeds brought from Europe, especially from England and Scotland. It was to follow these creeds without hindrance that many American colonists had crossed the Atlantic and settled in the New World. Calvinistic and Lutheran theology, Puritan zeal, the political philosophy of John Locke, and the "common-sense realism" cultivated in the Scottish universities had satisfied a colonial society which was not so much indifferent to philosophical ideas (indeed, it was somewhat unusually committed to them) as absorbed by the practical business of creating out of great material resources

formalized. To what degree American scholarship will retain these German borrowings remains to be seen. Along with German pedantry came a good deal of German philosophy, usually that of the post-Kantian idealists; and for a time it seemed as if German transcendentalism might take root on American soil. Its ablest exponent was *Josiah Royce*, a son of California pioneers, and long the colleague of William James at Harvard University. Royce was a very independent disciple of his German teachers. He never confused the Absolute with human experience; and he remained very empirical in his emphasis on individual being, and in his refusal to transcend temporal and spatial relations. Where the German absolutists tended to see the supreme actualization of the Absolute Mind in the political state, Royce found it in the religious community of mankind. In such ways, he eliminated those aspects of German absolutism which made it least acceptable to the American public; but he was nevertheless to witness the realistic and pragmatic reaction which virtually swept absolute idealism from the lecture halls of America.

The leader of this reaction was *William James* (1842-1910). James came to philosophy late, by way of art, medicine, and psychology. To this training he owed his most fruitful conceptions; but it may have prevented him from appreciating the historical development of philosophy, and its fidelity to certain root problems apart from which it loses its importance and even its identity. James' study of psychology, a new and adventurous discipline still in search of a "method," quickened his perception of the empirical and experimental character of science, and made him impatient with every sort of formalism; and these tendencies were strengthened by what he found in his study of psychical processes. In his *Principles of Psychology*, a work no longer authoritative but still the most stimulating of psychological texts, James moved from the introspective associational psychology which had been current since Hume to a functional and biological analysis of behavior. He refused

changing process which integrates the organism into its environment. In man, this process happens to be conscious and intelligent; but consciousness is not something additive to the process. "Consciousness as such" does not exist. Concepts are only fixities or uniformities of interaction, appearing in this vital process of adjustment. They are only relative constants, subject to change. It is because we rigidly and artificially separate this vital process into two incommensurable parts, a substantial world and a substantial mind, that there arise the insoluble pseudo-problems of which metaphysical theories are the pretended solution. If our knowledge of the world is our functional adjustment to the world, knowledge is conditioned both by what lies outside of us and by what transpires within us. If this is so, we cannot suppose that knowledge defines a reality wholly independent of ourselves, a thing-in-itself which needs only to be realistically inspected and described. Nor, on the other hand, should we conclude that knowledge is therefore wholly nondescriptive and subjective. The cognitive process is real enough, wherever it proceeds and whatever it be; and it involves both external nature and human activity in its content and structure.

James rightly believed that this functional conception, which sees in cognition an adjustment or relation between man and his environment, requires a new conception of what constitutes truth. Earlier philosophy had never wholly renounced the familiar assumption that knowledge is true insofar as it describes a structure which is intrinsic to nature itself, and independent of the mind. The philosopher might realistically affirm the identity of the cognized object with ultimate reality; or he might claim only that a certain correspondence exists between what is cognized and what is real, much as a photograph represents the thing photographed; or, failing to demonstrate even such correspondence, he might lapse into skepticism. But James struck a new and bold course. If cognition is man's adjustment to his environment, he said, then true knowledge is

tion of the earlier empiricism, American pragmatism is primarily a critical doctrine, antagonistic to rationalistic metaphysics. Its power and its purpose are never apparent to the thinker who fails to appreciate this fact, and who demands from pragmatism a systematic doctrine. The pragmatism of James was essentially his criticism of European rationalism. The pragmatism of Dewey and his followers extends this criticism to certain current forms of realism, which are shown, the writer believes correctly, to involve rationalistic implications. And if American pragmatism perpetuates the empirical opposition to absolutistic philosophy, it is also the expression of a liberal faith which continually opposes absolutism in practical life. Institutions, it teaches, are made by man for man; and they are therefore subject to perpetual criticism and continuous modification by those who use them.

In America pragmatism gives new voice and fresh application to the moral and intellectual faith which has generated modern science and modern society. It is the philosophy of the liberal and progressive thinker; and it claims to have found a more just and effective statement of the moral and philosophical truth which inspires modern man. But although pragmatism preserves a tradition carried from its parental source some centuries ago, and only now given new and forceful expression, the pragmatist is not oblivious of what has transpired since then; and he is especially aware of the philosophical significance of evolutionary science. It might almost be said that pragmatism is a form of empirical philosophy which identifies science with evolutionary biology, whereas earlier empiricism had identified science with physical and chemical theory. This and other shifts of approach appropriate to contemporary thought make pragmatism a doctrine difficult to define; and this difficulty is increased by the critical or negative character of the doctrine, which leaves its positive affirmations fluid and elusive.

James' initial statement of the doctrine, that truth is the cash-

dition of the city's becoming free of smoke; and here, belief may help to create its own evidence. But does our belief that the moon causes the tides help to make this belief come true? Or is this belief true simply because it states a fact which is wholly independent of whether the fact helps us or hurts us, and of whether it is believed or not? Can we, where King Canute could not, retard the tide by refusing to acknowledge its advance? James' pragmatism seemed to collide with every sort of realism—not only with philosophical realism, but with the realism of science and common sense.

The defense and development of pragmatism was undertaken by *John Dewey* (born 1859), who has remained its most fluent and influential advocate. Dewey brought to this crusade arguments and conceptions derived from nineteenth-century European philosophy, especially from the post-Kantians. Like James, he was influenced in his approach to philosophy by his study of psychological and biological facts. He placed knowledge in its concrete matrix, the progress of individual and social life; and he viewed it as an instrument of adjustment, serving the organism and society by bringing each into adjustment with the other, and also into adjustment with nature at large. But Dewey was also early and profoundly influenced by the thought of Hegel, which determined his epistemology and his philosophical method; and if we would understand contemporary pragmatism, which is that of Dewey, we must appreciate its relation to the Hegelian metaphysic, in spite of the fact that few pragmatists seem to be aware of this influence and that Dewey himself has forgotten it.

How could the Hegelian system, which we saw to be the most absolute of rationalisms, be converted into a doctrine which is extremely empirical, and critical of every sort of rationalism? Hegel, we remember, had created what he called a "new logic," namely "dialectical logic." Ordinary logic, he said, is purely abstract, trivial, and nondescriptive—its definitions are merely nominal or verbal; but there is a "concrete

The actuality he sees is the process of knowledge itself, integrating mind and nature. This process does, of course, absorb and digest the new facts which continuously come into the mind; but this involves for Dewey no realistic conception of an actuality external to the mind, and independent of it. The new facts which enter the mind are not to be conceived as existing in their own right, because they derive their character as "facts" wholly from their relationship to old and new hypothesis. Dewey's pragmatism, in short, is a new and empirical version of the post-Kantian idealism. It seems to attribute reality or actuality only to the process and content of mind. It avoids any realistic discussion of the relation of knowledge to an external world, a reality which is not knowledge but the object-which-knowledge-describes. It allows us to discuss only old-facts-as-known, hypothesis or knowledge, and new-facts-as-known. It confines us within human experience.

It should be perceived that the idea of a "concrete logic" necessarily involves an idealistic metaphysics. Logic is truly the study of explicit knowledge, wherein logic distinguishes the most general form from the varying content. If logical forms are "concrete," in the sense that they still contain all their particular factual content, then we cannot hope to distinguish what is general knowledge of nature from what is particular fact, nor from whatever it is that appears to the mind as particular occurrence. We cannot distinguish mind from nature. But pragmatism seldom acknowledges its idealistic presuppositions. It obscures these by its definition of knowledge and intelligence, which it identifies with the organic process of adjustment to environment. This definition itself implies, of course, a realistic and nonidealistic conception of nature, since it separates the organism from its environment. But the bodily organism, it is then said, is itself just the process of intelligent readjustment. The body is its life, and the life is its intelligence. This implicit idealism is further obscured by the pragmatist's dominating concern with the social environment. The most

of man, is in radical evolution, and submits to no fixities of statement. Even if we were to conceive of a fixed physical environment conditioning man, knowledge would still be fluid and progressive, never definitive; for each intelligent readjustment of the organism to that fixed environment would constitute a change of organic character, this would establish a changed relationship of organism to environment, and this would generate new facts requiring new hypothesis. In Hegel, we saw, the conception of natural evolution was degraded into that of a fixed dialectical system. By Dewey, evolution is given its rightful character; but Dewey still, like Hegel, presents the evolution idealistically, as that of intelligence or concrete mind. The needed readjustment of a thing to its environment is described as constituting a "problem"; the thing's reactions to the problematic situation are a trial and effort applying implicit or explicit hypotheses, which apprehend the character of the situation in its relation to the thing; and the true hypothesis is that which effects the readjustment, producing satisfaction. The satisfaction is only temporary, because the new readjustment will sooner or later generate new problems.

Pragmatism originated, we saw, in the pragmatic definition of truth. The truth of a proposition was said to be its beneficent consequence, or the character of the proposition which conditions this beneficent consequence. The truth of a belief is the good it does. To say this is to subordinate all factual judgment to moral judgment. This is the great virtue and appeal of pragmatism, that it converts all factual and scientific truth into moral truth. Kant had been compelled to distinguish scientific knowledge, as only phenomenal, from the true insight which is conscience. The post-Kantians had attempted to convert this moral intuition into a systematic philosophy, transcending a merely descriptive science. Dewey, rejecting the rationalistic presuppositions of Kantian thought, flatly identifies moral intuition with scientific intelligence. If science speaks truth, then its affirmations are those which effect beneficent conse-

is defined as being progressive and creative. More specifically, Dewey has convinced the jurist that law is but the instrument, continuously renovated, by which society readjusts itself to changing economic and intellectual conditions, so that law exists to serve life and not to control it; and jurists have turned to an empirical and pragmatic jurisprudence. He has told the statesman and citizen that governmental institutions may not be more fixated than the social actualities which generate and use government; and pragmatism becomes the faith of the political radical. In pedagogy, the educator is warned against formal disciplines, and inspired to a "progressive education" which will develop the native powers of the pupil, by exercising them in ways preparing him for the actualities of contemporary life. By a pragmatic criticism of art, the artist is weaned from classicism and the pursuit of art for art's sake, and led to make his craftsmanship the instrument of social reform and the dignifier of human labor and the common life. In matters religious, the believer is directed toward a liberal modernism which makes little of formal creed and institutional tradition, deprecates sectarian differences, and translates theological metaphysics into ethical doctrine and sociological instruction. "Science" and "society" become terms quickened by one another into new significance; and "Science and Society" becomes the slogan of a reformatory program which will recreate every human activity, not least by bringing the too specialized departments and institutions of human life into reciprocal stimulation and readjustment, in the acknowledgment of a common social responsibility.

All of this is high achievement; and surely no empiricist, nor any liberal, moral, and progressive thinker, would desire to diminish or undo the stimulating influence which pragmatism has exerted and will continue to exert upon American society. Pragmatism is a complex, rich, and many-sided doctrine. It revives and empowers the largest and most liberal tradition of modernity, going back to the earlier sources of this tradition,

that knowledge should be instrumental, and that we should perceive and establish its instrumentality, we must have descriptive knowledge of a real world, made up of existent persons and things.

If pragmatism has meaning only for one who is at heart a realist, what does pragmatism add to the realistic theory of knowledge? Our actual knowledge at any moment comprises a comprehensive summary of observed past occurrence. Pragmatism reminds us that this knowledge is not final nor absolute, but may be modified by future experience. We use our present knowledge when we hazard predictions, and the observation of the predicted occurrence confirms the knowledge on which the prediction was based. The pragmatist comes to regard this future confirmation of present knowledge as the sole verification of knowledge. The truth of the hypothesis, he says, lies wholly in its relation to the future occurrence which verifies it, *i.e.*, makes it come true. But, in sober fact, the truth of any actual hypothesis lies wholly in its relation to past and present fact, and to no degree in its relation to future fact. It is past occurrence, so far as known, which establishes an hypothesis; and the future occurrence which may confirm the hypothesis cannot do this until it too has occurred, and is past. Further, the prediction which later confirms an hypothesis need not be and usually is not some practical application of the hypothesis. It may be a purely scientific prediction, concerned only to test scientific truth. Knowledge is not made true by being used. Its descriptive truth lies in its comprehension of observed particular fact; and its instrumental value derives from its descriptive truth.

In its conception of truth, pragmatism still does unconscious service to the idol of absolute knowledge, a service which finally leads to skepticism. If the truth of a theory lay in its future consequence, knowledge would never be possessed, it would always be only anticipated. The pragmatist is led to identify knowledge with verified particular prediction because

and because it has quickened moral ideals nurtured by centuries of moral and religious education. Already, however, pragmatism begins to reveal its inherent inadequacies. It begins to infect the scientist with skepticism, by destroying his faith in the descriptive power of theory, and by persuading him that his theories are merely mental constructs implemental to prediction. And it begins to foster an unhealthy jurisprudence, willing to overlook the absolute and eternal requirements of justice, and to question the constitutional securements of justice, in too plastic an accommodation of legal principles to local and transient pressures. In Europe, pragmatism has been the resource of violent and reactionary groups, who defend their unscrupulous and tyrannical programs of action on the ground that the success of these programs, that is to say their forceful actualization, will pragmatically justify them. Pragmatism was the *activisme* of the reactionaries who betrayed France, and of the chauvinists who marched on Rome. "Just think this new Rome," cried Mussolini, "believe in it, and the thought will be made fact and verify itself!"

There is one other argument for pragmatism, however, which should not be overlooked. We have concluded that the only criteria of truth are logic and observed fact, which is to exclude the pragmatic criterion of practical utility. In strictness, the criteria of logic and observed fact do not suffice to single out just one hypothesis as true, invalidating all others. The same body of factual evidence will always support a plurality of self-consistent theories; and the ground upon which we prefer one of these alternative theories is in fact some pragmatic consideration of convenience, familiarity, or simplicity. Thus there is and will always remain a pragmatic element in knowledge. But is this an argument for or against the descriptive cogency of knowledge? We can use it in several ways. We can argue that science is never quite descriptive, since it involves some consideration of human convenience. We can say that the alternative theories are descriptively equivalent, since they

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this side of ultimate reality. But the term "positivism" was chiefly propagated by nineteenth-century Auguste Comte. Comte agreed with Kant that science is the sole authentic knowledge, and that it is still only phenomenal; but he refused to appeal beyond science, as did Kant, to a faculty of moral cognition able to grasp noumenal being, *i.e.* reality itself. Comte wished to revive the rationalistic faith of the eighteenth-century Enlightenment; but he was sufficiently influenced by the empirical criticism of Hume and Kant to be desirous of avoiding metaphysics. His proposal was to moderate the claim of science, by allowing that empirical or natural knowledge reaches conclusions which are less than absolute, and which describe only the phenomenal realm accessible to direct perception; yet at the same time he wished to establish science as the sole reliable cognition accessible to man. This estimate of science he called "positivism," intending to distinguish scientific method, as the sole approach to positive and verifiable knowledge, from the methods used by the theologian and the metaphysician. As Touchstone modestly said of Audrey, "A poor virgin, sir, an ill-favored thing, sir, but mine own," so the positivist deprecates any claim to realistic knowledge, yet ascribes exclusively to natural science whatever knowledge man may possess.

This positivistic outlook persisted throughout the nineteenth century, being especially favored among scientists and those close to science. In Germany, shortly after the mid-century, it was given a new formulation. *Albert Lange* used positivism as his basis for an attack upon materialistic metaphysics. Accepting as his initial postulate the critical positivism of Kant, Lange proceeded to show that materialism violates Kant's prohibition of dogmatic metaphysics, in that it carries the categories of science beyond human experience into pure speculation; but he then diverged from Kant in his naturalistic account of the origin of the categories. For Kant, these categories were fixed forms of thought, transcending the variable content of

these physical entities as existing in another psychical realm, not that of the physical entities themselves; and so we proceed to an absolute dualism of mind and matter, with its insoluble problems. But in fact, Mach meant, we know directly only one sort of entities, namely immediate sensations with their interrelations; and both "physical" and "psychical" facts belong in this one realm.

We need not appeal, therefore, to an external reality lying beyond the realm of experience, and other than it. Our usual supposition, which is that we explain phenomena by showing them to be the effects of real things lying back of phenomena, is quite unnecessary, and presumably false. We are justified in believing only what is actually observed and attested by science—all further belief is gratuitous and "metaphysical." We need to postulate, therefore, only the phenomenal realm.

Mach also pointed out that definitions of scientific objects are conditioned by the experimental procedures pursued in their study. He recognized three criteria of scientific truth. First, we should accept as true only those relational complexes, *i.e.* theories, which can be reduced to sensational elements. Second, we should require logical consistency, even though this requires theoretical constructions going beyond what is strictly verifiable in experience. And third, our hypotheses should attain a maximum simplicity, economy, and utility as the agencies of precise description and accurate prediction. In these three requirements, Mach recognized the three aspects of cognition which have variously led to realism, idealism, and pragmatism; but because he balances each aspect against the others, preferring none, he identifies himself with no one of these views.

Similarly complex and inclusive is the positivism of other late nineteenth-century thinkers. The most notable and brilliant of these was *Henri Poincaré* (1854–1912), the leading mathematician of his time. The logical element in knowledge is found by Poincaré to arise in mathematical intuition, which

and host of knowledge, and the legitimate seat of intellectual and political authority. The moral sense of the individual, felt as obligation to God or mankind or moral law, is really a sub-conscious awareness of society, induced by the pervasive force which is exerted by society upon individual thought and conduct. Sociology is the study of this ultimate, real, and authoritative being which is society. Religion, law, moral theory, art, economic theory and practice, science, and even logic are all, according to this "*sociologisme*," only the instruments and expressions of the "collective mind."

This doctrine looks back by way of Comte's sociology to Rousseau's doctrine of the general will. In the writer's opinion, it is one of the more perverse and dangerous fallacies of our time. The "collective mind" can be used to justify extreme nationalism, racialism, or other immoral and antisocial prejudice. In the name of science, this collectivism denies the objectivity of scientific truth, and teaches that every society must have its peculiar science rooted in a peculiar logic. As the fount of morality, it would erect the collectivistic state, exercising an absolute authority which is implicitly accepted, it says, even in the individual's deepest sense of moral obligation. In the name of religion, it denies the objective truth of religion, and makes religious faith only conformity to collective opinion, or loyalty to one's tribe. A similar doctrine, pursued by the German exponents of *Kultur-philosophie*, encouraged the movement to Nazism. Nowhere is the moral confusion of European society so evident and so disastrous as in this pseudoscientific sociologism.

Yet we have to recognize that this aberrance of thought, with its deification of society and convention, is a groping effort to do justice to the moral basis of knowledge, which is not to be so unhappily identified with "convention." It is this moral basis which gives to science its universality, and prevents it from becoming provincial, racial, national, and "sociological." It is this moral basis, we shall see, which

of the symbols as these are defined by his manual, he finds that the two sides of the identity are only different ways of saying the same thing. Thus the identity is an *analytic* proposition because it only reveals, upon analysis, the meanings of the symbols as defined; it is a *tautological* or self-evident proposition because it follows of necessity from the definitions of the symbols used.

To show that mathematical theory can be reduced to logical theory, *i.e.* to definitions of symbols together with the results of logical operations upon the definitions, was to show that mathematical theory is not a descriptive science making statements about the structures and processes of nature. Mathematical systems can be constructed *ad libitum*, and they may be of any sort we please. If we do not like irrational numbers, we may construct a theory in which these will not occur. If we are not satisfied with the three dimensions of height, breadth, and depth, we may construct a geometry with four or forty dimensions. Thus the apparent necessity or certainty of mathematical propositions (two and two must be four, cannot be five) stems initially from our fidelity to the meanings we have allotted to symbols. "Two" means "one and one"; so "two and two" means "one and one and one and one"; but "one and one and one and one" means "four." If we had originally defined "one and one and one and one" to be "five," then "two and two" would be "five," and "two and two are four" would be nonsense.

Because Kant had based his whole conception of science upon the mistaken premise that mathematical propositions are at once necessary and descriptive, the *Principia Mathematica* did in fact undermine and explode both the Kantian philosophy itself, and the metaphysical absolutisms which had depended upon it. But to demolish the Kantian philosophy was not to remove the indubitable fact which Kant's philosophy had endeavored to explain. This indubitable fact is the theoretical or systematic character of scientific knowledge. Science proceeds

positivistic in tendency. But this positivistic stage seems already to be approaching its close.

The categories of science which support the superstructure of natural knowledge, said Kant, arise from and express the mind's essential function, which is to integrate human experience. We cannot, accordingly, simply attribute to external reality itself the structures defined by these categories. If the structures initially express a unity which is imposed by the mind upon experience, they need not define a unity in external reality. There is good reason, Kant said, to deny to the categories this external reference; because if we assume them to possess it, we are led to antinomies or self-contradictions. To-day, the function which Kant ascribed to the categories is seen to be fulfilled by the faculty of logical improvisation, which generates symbolic systems such as mathematics; but because these logical systems are made at our pleasure, without resort to empirical verification, there seems to be no reason why they should describe anything external to ourselves; and when we do impute to them such descriptive cogency, we are led to nonsensical or meaningless statements which parallel the antinomies of pure reason discovered by Kant. This is the argument of the logical positivist; and it is not mistaken to see in it a modernized and corrected form of the Kantian criticism of absolutistic metaphysics.

Like Kant, however, the logical positivist entertains a lively sense of the importance, the inescapability, and the self-integrity of this logical structure in knowledge, in spite of the difficulties which it may raise with respect to our faith in theoretical description. Only where experience is so integrated into theoretical unity, the positivist says, do we have authentic knowledge. The ideal or objective of science, accordingly, is a theoretical system which would include all experience, at least insofar as this is theoretically conceivable. To this ideal of a "unity of science" the logical positivist calls all intelligent and well-meaning men. All scientists, all scholars, all educated

Or shall we insist that the logical element, because it is integral with the theoretical description, is part of the factual knowledge, and therefore invested with descriptive meaning? Is logic, as Kant would have inquired, at once self-evident and descriptive?

On this issue, the three dominant philosophical traditions again make themselves felt and arouse controversial debate. The realist argues for the descriptive cogency of logic, and affirms its power to define an objective and real structure in the world. He may assert that the separation of logic from the descriptive material of science can never be quite complete, so that logical theory remains a widest and most abstract descriptive knowledge. The pragmatist takes a middle position. The logical theory, he says, is the agency or instrument used in problem-solutions, just as is all scientific theory; and it will develop and shape itself as conditioned by the matrix of concrete knowledge. Logic is therefore neither extraneous to the material facts, nor itself a statement of material fact; but it summarizes operations of analysis by means of which problems are solved. The positivist, at the other extreme position, holds that logical structure is separable and has been separated, and that its independence of the factual material to which it is applied, and within which it is incorporated to produce "knowledge," constitutes a very real problem, which realism and pragmatism do not take sufficiently seriously. Contemporary positivism, in short—and this is its great merit—insists upon a fresh and thoroughgoing examination of the relationship of the rational element to the empirical element in knowledge; and it insists that this examination must start from the new grasp of logical form achieved in our own time.

This inquiry was advanced by a group of men sometimes known as the "Vienna circle." (Mach spent his later years in Vienna.) In his *Tractatus logico-philosophicus*, Wittgenstein pointed to certain difficulties which would seem to prohibit a realistic theory of knowledge. Every system of logic, he con-

the scene of a crime, might do service here. But it is evident that even the barest description of empirical fact must contain not only logical structure, but a good deal of everyday opinion or scientific hypothesis. There is no direct way of stating what is left in natural knowledge, when all theoretical form is taken away. The logical form and the empirical content of knowledge are not simply glued together, it is evident, in natural knowledge. It is upon the false supposition that the two elements are so simply related that logical positivism breaks down.

Already, however, the thinkers in this group are attempting new approaches to the problem of the relationship of logic to fact. Any scientific or other description of fact (or, for that matter, any fantasy) is the rendition into communicable language of something which is not language. We may, therefore, study language itself, and especially scientific language, as a sort of medium in which knowledge occurs. Much as the geometry of space enters into every material configuration existing in space, so the pattern of language will enter into every verbal description. We may turn, therefore, to a study of language-pattern, and discover in this way the linguistic structure which is incorporated in all explicit knowledge. This structure can be isolated, and reveals itself to be constituted of several elements. First, there is *syntax*, of which we learn something at school in our study of grammar. But school grammar is peculiar to one language, and we need a universal grammar. We possess this in the highly developed grammar or syntax of scientific language. The propositions which make up syntax consist wholly of statements about symbols and their relations. They refer to nothing outside of language. Thus a syntactical system can be elaborated which has no meaning in the ordinary sense, because it refers to nothing outside of itself; yet it is precisely definable and completely intelligible. All pure mathematics, *e.g.* algebra, is such syntax. Syntactical systems can be given descriptive meanings by a process of *interpretation*. We first elaborate a purely algebraic

It constitutes really a new and corrected rationalism. It agrees with the empiricist that logical study only abstracts the formal structure of empirical knowledge; yet it also agrees with the realist and rationalist, who holds that logical or rational form constitutes something which regulates and conditions knowledge, and which is not to be identified with the empirical content of knowledge. This movement raises again, in short, the issue which has long divided thinkers into the opposed camps of rationalism and empiricism: and it does this with the intention and the promise of reconciling their differences.

As yet, the proponents of this new and empirical rationalism are still somewhat uncertain of their way. They are embarrassed by their antecedent tradition, namely the nineteenth-century positivism which stoutly rejected all final "metaphysical" statement. They do not see that their clarification of the nature and function of logic may rid metaphysics of its terrors, by leaving wholly free and unconditioned the progress of empirical hypothesis. In our concluding chapters we will develop this possibility. Here we are concerned only to estimate and do justice to the important insight of logical positivism. This movement again makes clearly evident the *a priori* and formal element which abides in all theoretical knowledge, and indeed in all explicit description that makes use of language. Syntax, grammar, "the word" are always with us; and to use language is to affirm certain presuppositions of language, which impose themselves in this way upon all thought.

So we are brought back after a full circle to the point where philosophy began in Greek antiquity. "In the beginning was the Logos"—there is no thought which is independent of logic. How shall we explain, what shall we deduce from this ubiquity of logical form? Shall we say that the dependence of thought upon logic is the Achilles' heel of thought, because logic is merely verbal convention, just language, an arbitrary and subjective structure peculiar to man and human nature? This way leads to skepticism. Or shall we say that nature itself finds voice

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in two of its aspects. We could not say that every scientist has been a political liberal, nor that every political advance has consciously premised itself upon science. But on the whole, scientific and political progress have supported and stimulated each other. Together they have defined and propagated the sanity which is liberalism in thought and conduct.

It is still convenient to divide the evolution of western civilization into three epochs, ancient, medieval, and modern. In some respects, the modern period does return to the intellectual ideals of antiquity. It again pursues a theoretical science, and establishes a constitutional form of government. But modern civilization is more different from antiquity than like it. Antiquity was rationalistic in its science and conservative in its politics. Modern society is empirical in its science and progressive in its moral and political practice. Modern thought has recovered and absorbed ancient thought, but has subjected it to relentless criticism. This radical difference between modern and ancient society has its cause and explanation in the medieval centuries.

When we say that the science of antiquity was rationalistic, we mean that science was then conceived to possess a core of absolute axioms, which supposedly were known to the reason independently of experience. This core of axioms was *science net*. *Science gross* contained in addition the many applications of this rational truth to particular fact. The human reason provided science, the animal senses provided the material which was to be scientifically understood. And when we say that modern science is empirical, we mean that science is now conceived to consist of all of the generalizations which may be garnered from sensed fact. These generalizations may be woven together into organized theories; but the theories remain summaries of experienced fact, they are not regarded as rational and absolute truths. Whereas Greek science made rationally intuited principles the test of truth, modern science makes observed fact the test of truth. In this respect, the modern intel-

they had deposed their kings and made the law their governor, with themselves the executors of the law. They were aware that their political liberty distinguished them from the "barbarian" peoples about them, who still submitted to the personal despotism the Greeks have taught us to call "tyranny." Yet these tyrannies finally destroyed Greek freedom; and it is significant that the downfall of Greek liberty was due not to military defeat, but to certain internal weaknesses in Greek society. The Greeks could defeat imperial Persia; and they would have similarly repelled every invader, if they had not been destroyed from within by disunity and internecine strife. What defeated them was their failure to make their free and constitutional government the agency of political progress.

The rise and expansion of imperial Persia was not merely a military threat to the Greek cities. It was also a moral threat. There were those within the Greek cities who spontaneously prostrated themselves before that imperial might, and counseled their fellow citizens not to attempt resistance, but to appease and ally themselves with the irresistible invader. It required a loyalty religious in its intensity and almost fanatical in its courage to defy that advancing Persian tide. So the Greek leaders called upon their peoples for a religious faith in their institutions; and to establish or confirm them in their faith, the Greek statesman became a thinker, a scientist and philosopher. He taught the Greeks that in defending their constitutional governments they only did what true religion required of them. The whole cosmos, he argued, is a constitutional polity, ruled by a divine and universal law. In all of its motions, the cosmos manifests this eternal and immutable law. And to establish this religious truth, the Greek thinker created a natural science moving from observable fact to a theoretical knowledge of that cosmic structure which, he said, is natural and divine law. The *Logos*, he taught, is the true God. The civic constitution is the *Logos* in its human context, and loyalty to constitutional

always pressure-politics. A successful faction imposes its will upon society, and claims for its legislative acts a moral or religious sanctity which does not invest them, its actual authority being just sheer power. Law, they concluded, is only convention, a usage or imposition without real authority. Justice is the rule of the stronger; and the stronger may be the unscrupulous but skilful tyrant, the self-willed but able oligarchy, or the majority, individually weak but strong in their number. And the sophist was perhaps more willing than his opponent to put his thesis to the test of observable fact. Look at nature, he said, and you will see everywhere the rule of the stronger, the survival of the fittest, and the extermination of the weak. Nature is war, society is war, peace is a truce or a temporary balance of powers. There is no moral foundation for government because there is no moral law in nature—unless we give the name of moral law to this natural propriety by which the strong compels the weak. But in truth, according to the sophist, nature knows no law. Science has no authority. Only power has authority.

The Greek thinker, struggling to meet and defeat this sophistry, never perceived its full strength. Failing to distinguish the half-truth which lends it plausibility, he failed to detect clearly its error. The half-truth in sophistry, Greek or modern, is its recognition that *power lies in individual things*—and ultimately only there. The sophistic error was to deduce from this correct premise the mistaken conclusion that the power of the individual precludes moral law and civic justice. The Greek thinker, in his effort to combat the sophistic error, threw out both the error and the truth. Convinced of the cogency of his science, he now examined that science more intently, to discover wherein lay its generative insight. What he discovered was the theoretical form of science, which gives to science its unity, its stability, and whatever else distinguishes it from casual opinion. The error of the sophist, Parmenides decided, is that he trusts his senses. He sees individual things,

their near-emptiness they depict the concrete substance of truth.

Plato made a valiant attempt to correct this Parmenidean metaphysics by compromising with the sophistic irrationalism. With Parmenides he agreed that the reason apprehends the eternal One; but natural science, he said, arises when this rational intuition is applied to the changing and particularized world of things. Science is thus the rediscovery of eternal and universal form in the sensed particular changes of nature. This theory of knowledge, Plato sometimes implied, requires a dualistic view of nature, which is properly conceived as being compounded of two sorts of being. One is the immutable Form, which Plato called "Being"; the other is motion itself, called by Plato "nonbeing." In this Platonic dualism, the senses are allowed to provide the material of existent fact, in which the Being apprehended by reason is variously, incompletely, and transiently manifested. So sensory knowledge and empirical science are not sheer illusion, but a confused and imperfect version of rational knowledge.

Plato seemed to have saved the Greek faith in the "intellect," *i.e.* in theoretical reason. He turned back the tide of overt skepticism, which did not rally again for two thousand years. Because this Greek metaphysics also defined eternal Being as divine and Good, it saved also the profounder Greek faith in the identity of intellectual and moral truth. The reason, intuiting the Being which is the origin of all intelligible structure in the world, discovers those true forms which are the proper destinies or ends of natural motions. Everything seeks to manifest its true form; and since these forms are all reciprocally adjusted, as aspects of the one Being, this effort of things to realize their forms sustains the vast and eternal economy of nature.

But if Greek metaphysics saved the letter of intellectual and moral faith, it did not save natural science, which is the full confession of this faith. It allowed the senses to illustrate the

pessimism investing pagan civilization, which evinced itself in a nostalgia for the remote and golden past, finally possessed itself of the Greek spirit in this otherworldly, transcendental Platonism. The later Greeks, in particular the Stoics, no longer distinguished ideal justice from universal cosmic law; and this had the advantage of detaching the concept of justice from the city-state, to make it the concept of a universal moral law, antecedent to all government and independent of it. But the "blessed city of God" of the Stoics, although it contained all who acknowledged its moral government, was still an invisible realm, not to be sought in political actualities. Greek metaphysics was the consolation of a defeated and conquered people, who magnified their dream of a justice they could no longer hope to possess.

This consolatory metaphysical dream became philosophy, became even "science," and remained this for two millennia. No wonder that under later antiquity a rebellion moved against the Greek formalism that had become so unrealistic. Christianity made this rebellion vocal and effective, when it turned from theoretical to religious symbolism, in order to announce its optimistic gospel of salvation come to earth.

Greek metaphysics seemed to weather this storm of religious revolution. It emerged again in Christian theology and in a scholastic philosophy auxiliary to theology. Early Christianity had looked beyond the law to prophetic revelation, beyond the state to the congregation united by *caritas* or love, and beyond cosmic structure to the creative power which fashioned structure even in creating matter. But Greek legalism restored itself in a feudal ecclesiasticism, Greek formalism restored itself in a Platonic theology. Finally, however, in the Reformation and its consequences, the Christian revolution against pagan thought was consummated, to produce the science, the political theory and practice, and the emancipated society of the modern world.

There was really but one reform, one rebirth, one revolt, ushering in this modern world. It was the revolt which trans-

ever? "Natural rights" means underived and absolute powers. The concept of natural law may conceivably be derived from the concept of individual rights—whether it can be so derived is a question. But neither the concept of natural rights, nor the actuality of natural rights, is derivable from the concept of natural law. What our fathers meant, when they used the familiar verbiage of natural law to establish natural rights, was that the existence of individual rights is an absolute and non-debatable axiom. The individual is defined as the possessor of inalienable rights.

We are now beginning to see how the problem facing modern society must be stated. We must ask: How does one establish this principle of individual natural rights? The founders of modern government believed the principle to be a rational intuition, self-evident and infallible. They placed it beyond debate, exactly as we place beyond debate the truth that one and one are two. Yet we see that it cannot literally be placed beyond dispute. It is even now disputed; and there seems to be some evidence, provided by a scientific and empirical study of social process, against its truth. Can this evidence be outweighed? Or, even better, can it be analyzed, and discovered not to disprove, but to confirm more surely than ever, the principle of individual rights upon which modern justice has established itself?

It can be analyzed and shown to confirm the democratic principle. But to do this, we must undertake an analysis which goes deeper than what is ordinarily called scientific analysis. We must undertake philosophical analysis that probes to a truth which is implicitly obeyed and applied by all science, and which is indeed generative of science. We have to penetrate to philosophical truth. Our motive in seeking this truth is political—we wish to assure ourselves of the righteousness of democratic government. But we find that philosophical truth also conditions our faith in science. Democratic theory or practice, we find, is not subject to criticism upon any ground of

fact to submit to the necessities of logic, such submission being the necessary and sufficient condition of the theoretical formulation of fact in science. But *how*, on the showing of Hume that we find no necessity in nature, *do we justify this seeming assumption that nature is subject to logical necessity?* Is not this predication to nature of logical conformity just a convenient fiction? What evidence is there that nature is somehow inherently logical? How do we harmonize this rational demand, that particular fact shall always conform to some theory, with our empirical insistence that particular fact may be anything we observe it to be?

Modern civilization seems to stand rooted in paradox. The individual, we say, is sovereign; yet he is, of course, bound by a constitution which prescribes and limits the exercise of his sovereignty. Particular fact, we say, is the source and criterion of true theory, even as the individual is the source and the criterion of just law; yet particular fact may not transgress the requirements of logic, nor reject the conditions of its theoretical comprehension by the scientist. The constitution still limits individual freedom, logic still limits hypothesis and fact. We live in self-contradiction, holding the individual to be at once free yet bound, holding particular fact to be and not to be the sole criterion of truth.

Might we not say that this self-contradiction has worked well, and justified itself in practice? Has not the democratic constitution supported a century and a half of liberal and progressive legislation? Has not the logical constitution of science permitted the fullest accommodation of theoretical hypothesis to particular and observed occurrence? Why worry? Why not accept, as a mystery which somehow supports all that is intelligible and good, this self-contradiction at the root of science and society?

Because this paradox which has underlain modern theory and practice is today the source of intellectual, moral and political confusion, to a degree that threatens civilization itself.

ture. Our best reason is our most comprehensive summary of particular facts.

There is no doubt of the truth of Hume's contention, and no defense against his critical polemic. Yet if his truth were the whole truth, there would be possible no distinction between human science and animal cognition. The higher animals whose sensory faculties most resemble our own should also be physicists and chemists, and speculate concerning canine or other freedom. What Hume neglected was the agency in science of language, with all that language implies. He overlooked the cognitive interest, and did not appreciate the logical instrumentalities which this interest has generated.

So Kant attempted to correct Hume's error without sacrifice of Hume's truth. Science, he said, is the effort of the cognitive will to unify experience. It brings to this task the agencies which are reason. These are internal to mind; and we may take note of them in the explicit and necessary axioms, *e.g.* those of mathematics, which are basic to all description. Science is compounded on the one hand of contingent and particular fact, but on the other hand of the rational forms which bring this material into theoretical system. But on what evidence do we believe that this imposition of mental forms produces a science truly descriptive of external reality? There is no evidence, Kant concluded. We cannot suppose that science describes reality as it is in itself. The world described by science is a phenomenal world; it is appearance, not reality. The true or noumenal reality is known to us only in moral judgment. This is immediate, final, and absolute; but it grasps only the particular situation regulated by the moral act. Kant did justice to the rational element in science, but only at the sacrifice of our faith in the power of science to describe reality.

There followed the metaphysicians, who made Kant's failure to establish scientific truth their excuse for a return to dogmatism. Hume and Kant have shown, they argued, that empirical science reaches only phenomenal knowledge, which is

truth or to attempt justice, we must be able to say what "truth" and "justice" mean. And to define these terms in such a way as to leave truth and justice accessible to man is to say something absolute and incontrovertible about this world, in which truth is sought and justice aspired to. What is this absolute or philosophical truth which makes reasonable the pursuits of scientific knowledge and justice?

We are now ready to undertake successful assault upon this problem, which has hitherto defeated philosophical inquiry. Its solution, we have learned, requires us to establish the identity of the empirical and logical criteria of truth, the false distinction of which has hitherto prevented the reconciliation of rationalism, emphasizing the logical criterion, with empiricism, emphasizing the criterion of fact. Science requires hypothesis to be at once logically self-consistent and consistent with observed particular fact. We need to know that these two demands can both be fulfilled in a single hypothesis, and that the satisfaction of one demand does not preclude that of the other. What we shall show is that there are not two demands. There is in truth only one requirement, which is at once rational and empirical. Logic, we shall show, only implements the empirical requirement that hypothesis shall conform to *all* observed fact. It is the word "all" that generates logic—logic secures impartiality and comprehensiveness of hypothesis. The logical requirement is the demand that the empirical requirement be fully satisfied, and not satisfied only in part. The solution is as simple as that. This is the conjunction of reason and sense, fulfilling the moral requirement of justice or impartiality.

So we shall bring to an end the ancient controversy between rationalism and empiricism, and establish at last the truthfulness of science and the power of the human intellect to reach a realistic knowledge. The controversy was not fruitless, because it was the necessary preparation for this reconciliation. The reconciliation demonstrates the simple but solemn truth, stated long ago by Socrates—that intelligence and righteousness are

27 THE ESTABLISHMENT OF PHILOSOPHICAL TRUTH

IN THIS CHAPTER WE BRING THE DEVELOPMENT OF philosophy to a successful issue by resolving the problem which has defeated past thought. Science requires hypothesis to conform to fact, yet seems also to insist that fact shall conform to logical necessity. Democratic government affirms the sovereignty of the individual, yet seems also to require that the individual submit to law. Why should particular fact defer to the requirements of logic? How should a sovereign individual submit to law?

There can, we intimated, be only one resolution of this problem. The two requirements, apparently contradictory, must resolve into one and the same requirement. This has usually been perceived, and the philosopher has attempted to show either that the logical and legal requirement includes the other (rationalism) or that the logical and legal requirement is not valid (empiricism). But this contempt of one or the other requirement led only to interminable controversy between opposed schools of thought.

In modern times the problem has been beclouded by a misconception common to both schools. Because it was clear that

have inquired into its philosophical implications. The inertia of past intellectual habit makes such inquiry difficult, even for those whose labors initiate the new conception. Usually a generation has to pass, and another generation grow to maturity in the new way of thinking, before the full implication of a revolutionary hypothesis is seen.

The revolution we refer to is popularly associated with the name of Einstein, and properly so, although many others have participated in it. We may define it as a departure from certain of the principles of the "classical" science of Newton. It might be called the inauguration of romantic science, using the word "romantic" somewhat in its literary or aesthetic sense.

We are not concerned here, fortunately, with the whole current and consequence of this revolution in physical science. Our concern is limited to one point, namely the implication of the new science for our conception of the relation between mathematical theory and the science of physical nature. The effect of the Einsteinian hypothesis is to provide a new and liberating insight into the relation of physical science to mathematical theory. Since the time of Parmenides, *i.e.* the fifth century B.C., it had been assumed that physical hypothesis must defer to mathematical theory. The axioms of mathematics were held to be absolute self-evident truths vouched for by the reason itself. We must agree that these axioms seemed self-evident; and prior to Einstein there had been established no instance calling into question their exact applicability to nature. Plato, it is true, allowed that nature, because of its material element, might fall short of exact conformity to mathematical necessity; but Descartes and the moderns were more strict, and required the exact conformity of observable fact to mathematical principles. It is this uncompromising rigor of modern science that has led to the correction of its ancient error.

Until our own century, then, mathematical rationalism seemed invulnerable. Mathematical axioms seemed rational and

they were strange and difficult to handle, the minute measurements testing their approximation to fact were not at that time practicable, and Euclidean geometry satisfied every scientific need; therefore they were placed on the shelf of mathematical curiosities. However, even the construction of these new geometries was disproof of Kant's contention that Euclidean geometry rests on a priori synthetic principles; for the new geometries rest equally upon "self-evident principles," identical with those of the old geometry; and the several geometries, new and old, cannot all be true.

This conclusion was empirically confirmed early in this century when Einstein and his successors revived the non-Euclidean geometries, using them as alternative and divergent hypotheses in the description of physical fact. It was found that Euclidean geometry sufficiently defines physical motion only in certain limited cases; and the physicist in his most general hypotheses now creates his geometry to order, in the light of empirical fact. Geometry, in short, is henceforth physical hypothesis, not rational intuition of self-evident truth.

This removed geometry from the domain of "rational science"; but arithmetic remained. It could still be argued that arithmetical principles constitute a domain of rational knowledge, necessarily applicable to all particular fact. If so, arithmetic would still provide the needed evidence that there exists a faculty of rational intuition, independent of and superior to empirical hypothesis.

That arithmetic does not comprise a science of this sort was shown by Russell and Whitehead, whose logical studies were contemporaneous with the development of the physical theory of relativity which so transformed geometry. These two thinkers invalidated Kant's contention that arithmetical propositions are at once a priori and synthetic, which would mean that they are self-evident or necessary truths descriptive of universal nature. The *Principia Mathematica* showed that number-theory can be reduced to, or replaced by, a system of

such a symbolic system, and develop geometrical symbolism purely as logicians and without thought of the descriptive truth or falsity of the system; and such study is "pure geometry" or "mathematics." But we may also consider geometry as descriptive hypothesis, and study its conformity to physical or astrophysical fact; and when we do this, we are empirical scientists. This profitable division of labor into analytical and experimental studies should be exercised in every theoretical science, the logician developing symbolic systems, and the empirical scientist applying and testing these systems in field and laboratory.

But we are not so much concerned with the new scientific developments opened up by this recent intellectual revolution, important though these are, as with its implication for philosophical truth. Its immediate philosophical consequence is its decisive verdict against rationalistic philosophy in favor of empirical philosophy.

There is, it makes clear, no self-evident rational knowledge, at least of the sort pretended. Our only knowledge of nature is empirical knowledge, comprised of hypotheses of high probability. Logic and mathematics are not natural knowledge, but constitute an art of symbolic construction or notation; and any descriptive character they may possess derives from the empirical material from which their logical elements were originally abstracted. It will be some time, perhaps, before this implication is widely perceived and becomes a commonplace of thought. Old errors live on, and rationalistic metaphysicians will still advance a "concrete logic." But there can be little doubt of the issue. The newly enfranchised science and the expanded "mathematical logic" are here to stay; and their implications will steadily become evident.

But this is only half the story. Admitting that neither logic nor mathematics nor any other "rational science" may confine scientific hypothesis or prescribe to empirical science; admitting that language, with the logic which is the syntax of lan-

and replaced by a new theoretical hypothesis consistent with the recalcitrant fact.

Thus the effect of logic, stated in its simplest terms, is to ensure that all observed fact shall have its due place in the symbolic construction which is scientific theory, and that no particular fact shall be disfranchised. The symbolic construction which is the logic of a science does not express a concern for logic and symbolization as such. These are only means to scientific impartiality toward fact.

Logic implements empirical impartiality toward observed particular fact. This is its sole scientific function, as is demonstrated in two ways. First, the scientist holds no brief for any specific hypothesis as such, but he is always willing, just insofar as he is an authentic scientist, to relinquish a theory which fails to meet all of the evidence. He is not interested in theory as such, he is interested in theory only as a device enabling the impartial accommodation of fact. Secondly, the scientist does not insist upon, and no longer expects to find, a single theory covering all fact. Modern theoretical science is incorrigibly pluralistic, advancing physical theory, biological theory, social and psychological theory simultaneously and in independence of one another. This relinquishment of the old rationalistic goal of a single universal theory implicitly affirms the auxiliary character of theoretical form and the instrumental character of logic. If logical unity were an end or objective in itself, the plurality of theories would be an indictment convicting science of error—which is just what the rationalist frequently considers it. But modern science, subservient only to evidence, has substantially established the truth that natural processes present diverse structures requiring for their description many theories, not only one. There is, science increasingly assures us, no single theory of nature.

We reach here the momentous fact that is the solution of our problem. The two criteria of truth, logic and particular fact, are really one and the same criterion. True rationalism is em-

value, we know, are characters of real being, and real being is individual being. It follows that real value is by definition differentiated. Value is difference, not sameness; nonconformity, not orthodoxy. Individuality alone has value. The rationalistic identification of value with likeness or structural unity, which in modern times has generated the absolute and totalitarian state, is finally a blasphemy against justice, truth, and God. Justice looks beyond sameness in order to appreciate individual character, truth looks beyond identity in order to perceive particular difference, God knows each creature in its individual uniqueness. Yet the blasphemy was well meant; and it was correct enough in its assumption that logic somehow indicates the moral nature of nature, and implements our apprehension of the morality of nature. The rationalistic error was to mistake the nature and function of logic. It is not logic, we saw, which requires the comprehension of nature under a single theoretical hypothesis. Neither logic nor the logician requires nature to be unified, homogeneous, same. Logic demands nothing in the way of description or definition of nature; it ensures only that our statement of fact, whatever it be, shall neglect no fact. Or rather, it ensures this impartial comprehensiveness of fact if we will first, prior to all analysis, set ourselves to do justice to all fact. If we will be just and empirical, logic will implement our will; but if we want to be dogmatic and unjust, logic will no less subserve the elaboration of rationalistic systems, which may be imposed upon facts and upon men as sanctified truth. Logic is indifferently the tool of truth and of error. But we would be unjust to logic if we emphasized its susceptibility to abuse at the expense of our appreciation of its great service. Given the will to truth, logic implements that will. Thus is justified Augustine, who established a new civilization upon the primacy of the will.

What is the will to truth? It is the will to do justice to each and every particular fact. What is particular fact? It is our apprehension of individual being at some time and place. All

is effectiveness, power. The force and quality of every particular action determine those of the particular reaction. Common sense and justice equally require a respect for particular fact and individual being. Prudence and kindness are ultimately one. Every injustice done to individual being of necessity recoils upon the doer; and every mercy blesses him that gives no less than him who takes.

This is the moral law of nature, as it is that of society. It is the meaning of the metaphysical truth which affirms the reality of individual being, and in consequence denies the reality of "universal being." These last two words are meaningless, unthinkable; they comprise a self-contradiction. *There is no universal being*, there are only individual beings which in some respects, but in no case in all respects, may be similar. The respects in which things are similar or dissimilar must be determined by observation and experiment; and that is why empirical science must be the rule of life, of society, and of God.

After six centuries, we have justified the doctrine of the medieval nominalists whose real work, we remember, was the establishment of empirical science. The nominalist denied the reality of universal being in the interests of individual being; but he was unable to do justice to the power of theoretical knowledge. General ideas, he averred, exist only in the mind; and this was to leave science without claim to objective truth. We correct this error when we acknowledge the existence of real similarities among individual things. If similarities are not real, how should specific and individual differences be real?

We discover herein the integrity of modern thought. Since Roscellinus, Grosseteste, Roger Bacon, Duns Scotus, and their successors initiated modern thought, there has moved forward this single faith in the absoluteness and primacy of individual being. Out of it has been built an empirical science and an industrial economy. Out of it has been generated a democratic society, pledged to equalitarian justice among men. These two developments are truly one. A society which industrializes

planation of specific similarities. There arises the question, still empirical but philosophical in its breadth, why there should be similarity at all, of any sort. The Greek philosophers asked this question, but would not wait for an answer. They replied at once: It is of the essence of nature to present similarities; for nature is truly one, and its identity appears, compounded with difference, in similarities.

But this is false. The true essence of nature is individuality or difference of character. Similarity is overlaid. That the inquiry into the causes of similarity is a significant, possible, and profitable inquiry is demonstrated by every causal hypothesis; but it was given a new and striking significance when Darwin showed that every organic similarity is the consequence of the mode of reproduction of living organisms, as these are influenced by their environment. By asking this philosophical question about similarity in one special field, Darwin revolutionized biology. But the question must be carried into every field, and be asked finally of nature at large, until we learn at last something of the creative power that has moved in all things to fabricate this world. For we are intended to know even as God knows, in naked truth, and not "see through a glass, darkly."

respect both to its intensity and to its objective, from their free religion, which imposed upon the individual a religious and moral responsibility not to be delegated to king or governor. Accordingly, the revolutionary founders of the first modern republic, the short-lived Commonwealth, stated their political faith in religious terms. Such statement would still be fitting. We still hold liberty of conscience and thought to be the primary freedoms, generating all others; but the religious terminology would be invidious and misleading today, especially among peoples still intellectually dominated by authoritarian religion.

It is this selfsame religious faith, however, which finds its authentic statement in philosophical truth. There is but one Truth, capable of infinite variety in its formulation. Religious mysticism, which is what most moderns mean by religion, is the illuminated perception of the holiness which everywhere invests individual being, *i.e.* reality. Philosophy corrects rationalistic theology when it translates this ineffable mystical experience into the sober statement, "Reality is individual being," and proceeds to enlarge this simple truth into a descriptive science. We still expound in this science the faith of those who inaugurated modern government; but the word "faith" now loses its equivocal meaning. It no longer means a belief transcending reason, knowledge, science. It means the truth which generates reason, knowledge, and science.

It scarcely need be elaborated further that philosophical truth, so far from being something that eludes demonstration, is implicitly demonstrated in every demonstration of fact whatsoever. Every scientific hypothesis applies this truth, and in its confirmation confirms it; nor does any description of fact have meaning or truth except in virtue of that one truth. Every practical program has moral claim and final efficacy in the degree to which it is an acknowledgment of all of the individuals affected by it. Every work of art owes its beauty and significance to the artist's perception and successful com-

political achievement. The great universe itself, they asserted, is a political community ruled by natural law. Significant, surely, is the parallel between the political decline of Greece and the transformation of this Greek science into an unrealistic metaphysics. It is because Parmenides suspected, and Plato saw, the failure of Greek government that these men looked beyond an empirical science descriptive of actuality to a transcendent science descriptive of a Being which "is" yet does not exist. Because they witnessed political decline, they renounced that faith in actual justice which had inspired the earlier scientists. They could not or would not see that the cause of Greek distress was the smallness of their sovereign city-states, and the confined and obstructed justice which this entailed. They could not agree, accordingly, that the doom of their cities, admittedly inevitable, was also just. And with this failure of moral realism went a failure of cognitive or scientific realism, a hardening of empirical inquiry into an impressive but sterile metaphysics.

The parallel is seldom quite so clear in later times, chiefly because the intellectual habits of the Greeks (or should we say their vocabulary?) were retained by peoples politically undeveloped. We should see that Greek morality, as this appeared in their political institutions, was as astonishingly beyond that of other peoples as was their science. Yet there is observable a loose but discernible connection between the feudal and ecclesiastical hierarchy of the Middle Ages and the medieval predilection for Neoplatonic and Aristotelian hierarchies of forms. Again apparent and striking, however, is the historical connection in the modern period between the developments of empirical science and democratic government. Our purpose here is not to review this historical parallel, but to diagnose and understand it as it works today.

Modern democracy differs from Greek democracy in that it places the individual above the law as the maker of law, whereas liberty meant to the Greeks a common and equal sub-

We have seen how the past confusion of logic with empirical hypothesis has limited and confined science. So long as geometry was conceived to be "pure mathematics," *i.e.* a study resting on absolute and self-evident axioms, its postulates were incumbent upon the scientist, and hypothesis had to remain within its framework. No hypothesis might be advanced, none was conceivable, which violated those principles. When scientists broke through this confinement by their acceptance of non-Euclidean geometries, they demonstrated that geometry is not pure but applied mathematics, *i.e.* empirical hypothesis; and this ended at least the old confusion of the logical or theoretical form of geometry with the descriptive material so informed. "Pure mathematics" we now see to be a synonym for "logic," a study of symbolic systems viewed in their formal clarity and in abstraction from any consideration of these systems in their descriptive use. To distinguish in a scientific theory the logical or formal element from the descriptive, empirical, or material element is to liberate hypothesis; because one and the same logic can now be compounded with an indefinite number of descriptive elements, to produce a variety of self-consistent descriptive theories. These theories are then alternative hypotheses, susceptible to confirmation or disproof in the light of observable fact.

The confusion of logic with descriptive theory limits hypothesis to an "orthodox" field of speculation; but what are the positive effects of this confinement, and what suggests or motivates the confusion? Generally, it is just the result of intellectual inertia, and has no positive motive. It is difficult, even or especially for the scientist, to change those broadest descriptive principles which have directed all past analysis. To change these requires him to create new intellectual habits. Yet, because science is finally motivated by love of truth, it is chiefly scientists who have escaped from dogma and initiated new ways of thought. It is usually others than scientists who have sought to confine empirical hypothesis and intellectual progress

There the confusion of logic with descriptive hypothesis is seen to involve the neglect of some body of particular fact, in the interests of some favored body of fact. In practical matters, judgment is seldom so easy; but the dogmatist usually betrays his prejudice by admitting that his dogma involves injustice to some individuals, and arguing that this is excused by some larger good consequent upon it. But justice, which is philosophical truth, forbids such casuistry. It requires the full acknowledgment of *every* individual claim, not only of some or of most. It requires acknowledgment of individuals past and gone, of individuals now living, of individuals yet to be. The principle acknowledges no limitation of time and space. The only limit is the actual one, our relative ignorance of individual being. But this confession of ignorance excuses no dismissal of known fact. Moral responsibility is absolute and uncompromising.

To defeat dogma and enthrone justice, modern society created the democratic constitution. As the intention and effect of logic is to secure living contact between hypothesis and particular occurrence, so the intention and effect of this constitution is to secure the living repercussion upon government and legislation of the individuals governed. To understand its efficacy, compare the democratic constitution with nondemocratic constitutions. Every people has its political constitution, written or unwritten, because "constitution" means the habitual procedure determining the appointment of government, the sources and limits of legislation, etc. The constitution of a non-democratic society is quite simply one which intrusts the responsibilities and powers of government to some group fewer in number than the whole people. It is perhaps irrelevant to justice whether this group rules wisely or foolishly, benevolently or malevolently, in order to preserve hereditary privilege or in order to inaugurate utopia. Such government is unjust, however "good" or "bad" it be, because it violates the first requirement of justice, which is that every human being

would injure or destroy it. Our first objective in government should be minimum government, leaving a maximum sphere to freedom, persuasion, and education. However, there can be set no formal limits to government. The intention of the constitution should be to secure to every individual his participation in government and his voice in legislation. The conditions securing this franchise will vary with social progress. What provides these conditions belongs in the constitution; what does not has no place in the constitution. Constitutional law is not in its formal prescription eternal law. What is eternal in it is its purpose, which is to secure the conditions of self-government. If it should be found, for example, that an extreme maldistribution of wealth defeats the intention of the constitution, then the legal correctives of that evil should appear as constitutional amendments. It is not debatable, however, that government should be limited in its every dealing by "due process of law," because whatever violates that edict is done arbitrarily and illegally. Just government is necessarily constitutional government, or government by law; for there exists no device other than legislation which allows a plurality of individuals to establish and enforce a cooperative decision. It follows, finally, that the final arbitrament must be that of the court of law, because it is there, and only there, that the law of the land, including its constitutional law, is called into effective operation. The division of government into three branches is not a device to limit government by reciprocal checks and controls; it is the necessary mechanism by which a people makes, implements, and applies its law.

Democratic government is today the chief means by which the individual exercises his moral responsibility. This responsibility is not limited by national boundaries, it is to and for all men everywhere. It is evident that our political acts affect the lives of individuals in other nations. In a democratic world, national polities would be jurisdictional districts and not sovereign states. There is truly no sovereign state, there is truly

movement which in Britain and America proceeded to political revolution, it may be argued, had its wide origins in the popular spread of the Franciscan brotherhood in the thirteenth century. However this may be, there is no question of the fact that the establishment of democratic liberty by means of a written constitution preceded by more than a century the complete enfranchisement of science. This latter has occurred only in our own time. It is only today, in virtue of the clear and explicit distinction between formal logic and descriptive science, that empirical hypothesis is finally freed from the last dogmatic shackles which confined it.

Now that science is finally freed from the sheath of dogma which had protected its immaturity, science may properly be the support of intelligent practice. Its first assignment is to illuminate our understanding of the relation of constitutional to other law. If we lose faith in the democratic constitution, it will be because this constitution seems to require "interpretation" dictated by what is vaguely referred to as "different social philosophies." This is the vocabulary of intellectual and political skepticism; and there is no question that a succession of court majorities widely diverging in "social philosophy" and in their consequent legal decisions will weaken faith in democratic justice. Yet what is the alternative? So long as our own Constitution is fixed, must it not by some expedient be made to fit the facts, *i.e.* conform to social actualities? Of course it must. Not to conform would be finally to become discredited as an agency of justice, and to be thrown off. Yet how can it be thrown off? A people ruled by law must abide by law. It must somewhere, either in a Supreme Court or in some lower court, accept the jurisdiction of law. To throw off the Constitution would be to live by no constitution, and no longer live by law; and this means, whatever one pleases to call it, a personal dictatorship by some permanent or transient group usurping justice.

Our error has been to think of the Constitution as fixed, and

confined within that one form or logic. It is free to cast new forms, even new logical forms. Let us establish this last freedom!

We said that geometry had disclosed itself to be empirical hypothesis, whereas arithmetic had disclosed itself to be a purely logical system or notation. This statement was roughly correct, but not the whole truth. The several geometries differ in certain only of their generative postulates, other postulates remaining formally identical in all. These identical postulates, disclosed by formal analysis, comprise the "logic" of such geometry as we now have. This does not mean, however, that there is no other logic or notation useful in the description of physical nature. As a matter of fact, physical science makes very great use of nongeometrical logic, for example in quantum mechanics; and the next rather terrifying responsibility of the physical scientist, to which Einstein and others already devote themselves, is the creation of a single notational system or "logic" which will replace these two notations now in use.

Similarly we should not suppose that arithmetic or number-theory, whatever its "purely logical" status, defines forever the largest outline of numerical form. Mathematicians such as those who develop the theory of groups already explore beyond these confines. There was a time when mathematical logic, or arithmetic, forbade the notion of fractions not to be expressed as a ratio of two integers, forbade the notion of nothing, forbade the notion of negative quantities, and forbade many another notion now familiar to the mathematical student. Arithmetical progress has been a continuous re-creation of notational logic—the only sort of logic we know.

So it is with the democratic constitution. The modern form is not that of the Greeks. The Constitution of the United States is not the original Constitution, which has been subjected to amendments each of which modifies the meaning of the Constitution as a whole. What we need accordingly is a political science which will do for constitutional law what the

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NOT THE LEAST OF THE PROFITS DERIVED FROM philosophical truth is its enfranchisement of science, through the complete liberation of empirical hypothesis. Even the astounding scientific achievement of the last half century proceeded under a rationalistic handicap. This was the assumption that science is a superstructure built upon a fixed foundation of obligatory principles, or committed to a single definable "method." Many books are published professing to present scientific method; but examination reveals these to be only a confused conglomerate of logical formulas and current hypotheses, cemented by vague discussions of probability, induction, and verification. In truth, the only condition imposed upon scientific speculation is conformity to the two criteria of knowledge, logic and fact. Sufficient understanding of formal logic may allow the scientist to estimate within his special field the powers and limitations of current scientific language, a perception which might enable him to extend the scope of his hypothesis; but the scientist is seldom hindered by any incapacity of logical power. The physical scientist obtains in his mathematical training a competence in logic surpassing that of any save the most expert logicians; and every appropriation of scientific theory involves large understanding of logical

ceptions blind us to individual quality, and thereby destroy society.

What is the truth in this assertion? There is no truth in it. We have seen that the primary principle of science is its empirical regard for particular fact, and that this regard for particular fact activates a moral reverence for individual being. If there is any way of thought which does not mechanize thought and which properly esteems individual character, that way of thought is thereby scientific.

Why therefore does the lie flourish, whence derives its plausibility? Its plausibility derives from a confusion of scientific thought with scientific formulas. Scientific theories are large and complex generalizations, defining certain widespread characters of natural processes. Necessarily, general theory abstracts in its statement from much particular difference. The moralist, who is no scientist busy with the creation and application of theoretical hypotheses, and whose knowledge of science is culled from hearsay or textbooks, may suppose science to present its theories as themselves a final description of nature; and if he does so, he may well conclude that science abstracts from particularity and individuality. If the moralist really were the logician he sometimes pretends to be, he would know that no general theory pretends to describe anything. The theory is just a symbolic notation. Scientific description is the use of this notation in the description of particular situations; and this necessarily involves the greatest deference to particular or individual character of which the human intellect at any time is capable.

Science in its applications, as in its creation of knowledge, is intrinsically and immaculately moral—it is nothing else than the moral regard for individual being. Every sort of statement classifies individual things under general terms indicating common properties; but it is only science which subjects general statement to particular verification and which expertly adapts it to the individual case. This is the very definition of science,

in their praiseworthy effort to emulate the theoretical achievement of physical science, have retained some of the conceptual and mental habits of physical science. As the scientific study of human behavior perfects its theory, it will necessarily rid itself of concepts and habits ill-adapted to its specific material, which is living, intelligent, and individuated human beings. There, too, it will be seen that action directed by scientific knowledge is of necessity moral action, in this case controlled by respect for human character; and it will become a truism that an industry which injures or deceives human beings destroys the capital on which it lives.

However, this mature and developed sociology does not yet exist. What shall we do, in the meantime, to prevent the blind application of the physical and biological sciences to problems requiring a science of man which we do not yet possess? It is this unintelligent application of science, and this lack of social science, which support and even in some degree justify the attack upon science as a mechanistic and materialistic faith destroying the human spirit. Turn from science to art or to religion, say these critics of science—there alone you will find a sort of knowledge which does justice to what is specific and individual in man.

We must discern the element of truth in this criticism. It lies in its recognition of *the specificity of nature*. Knowledge of physical, vegetable, and animal process does not comprise a knowledge of what is specifically human. The difference between man and other beings is more important, scientifically and morally, than his likeness to other things. We still suffer even in contemporary science from that seventeenth-century rationalism which identified reason with a single theory of reality, the error which empirical science in all of its development has steadily invalidated. *It is that very rationalism which is mechanistic and materialistic*. There is, says the rationalist, really but one universal Being, possessed everywhere of the character defined by self-evident principles of reason; and in-

specific differences which distinguish things, plants, animals, and men? Would not psychological theory and biological theory be special variations of that most abstract theory? Science would still be plural; psychophysics and biophysics would not be descriptive of geologic and astronomic fact.

We may accredit to Samuel Alexander, Lloyd Morgan, and other "emergentists" the discernment of this ineradicable pluralism of science. Theoretical analysis, say these men, has definite limits. The reduction of organic process to physico-chemical process (*i.e.* the description of living behavior in physicochemical terms) does not affect the reality of those specifically organic characters which distinguish organic from inorganic matter; and similarly the reduction of psychological fact to biological fact does not erase the qualities distinguishing man from other animals. There is still required a plurality of distinct theories describing respectively physical, organic, and human structures.

This is true; and so far as it goes we applaud the emergentist for his insight; but if we stop with emergentism, we discredit science more profoundly, and undermine scientific faith more effectively, than does any anti-intellectual critique of science. The emergentist still identifies science with its general theories, he is still a rationalist in his conception of truth. For he goes on to say that science and the human intellect are eternally limited to this analysis of fact into incommensurable sorts of fact, respectively physical, biological, and psychological or sociological. In virtue of our physical, biological, and psychological theories we are enabled to discern in natural process some three variant structures, and so reach causal explanations of fact; but just for that reason, according to the emergentist, we must refrain from all effort to explain causally the relation of these differently structured processes, or their generation one from another. We may not seek to explain fully how metabolism transmits inorganic matter into vegetable and animal flesh, nor how inorganic matter generated a living world.

The simple truth is, we know, that the scientist must postulate the presence of causal connection *before* he theorizes about it. The emergentist would require the scientist to have his theory perfected, even before he starts to construct theory or to entertain empirical hypothesis. The emergentist forbids all original speculation, all new hypothesis. This would fixate current theory, much as Greek metaphysics made dogma of Greek science. But, to repeat, the source of his error is the fallacious notion of general or universal causation, exerted by general or universal Being. It is true that a primary postulate of science has been the universality of causal connection; but this postulate refers to *particular* causation, not to general or universal causation, of which science knows and will know nothing. The causal postulate is already affirmed in the truth which generates science, and which asserts that real being is individual being. "Real," by definition, means causally effective. The rationalistic error, we conclude, is to see in the observed similarity of particular causal processes a condition of the existence of such causal process. In truth, the similarity of causal processes is only the condition of our knowledge of specific causal process. We know that events are caused, whether or not we can describe their causes. We may not define nature in terms of the limitations of human knowledge.

But what is the correction of the emergentist's error? Its full correction is philosophical truth, postulating the universality or ubiquity of necessary *particular* causation. Without this postulate all scientific inquiry stops, and scientific knowledge evaporates into mere verbiage. But its more pointed correction is a perception of the implications of this truth for current and future science. Science must and does postulate the complete and intelligible determinateness of the process of evolution; and as a matter of fact it already inquires, not without success, into the causal processes transmuting inorganic into organic matter. There is no reason why the evolutionary process should be cut for purposes of theoretical analysis at just two or three

30 THE FUTURE OF PHILOSOPHY

IN THE PREVIOUS CHAPTERS PHILOSOPHY HAS BEEN presented as a study politically motivated, inquiring into the implications of natural knowledge for the opposed postulates of necessity and freedom. The postulate of natural necessity has been shown to support the doctrine of absolutistic government, and democratic self-government has been shown to require the postulate of natural freedom. Long controversy between rationalistic philosophers affirming necessity and empirical philosophers affirming freedom is closed by the victory of empirical philosophy, achieved in our own century.

But now that the long controversy is over and the victory of liberal theory assured, it is necessary to turn back to do fuller justice to the rationalistic philosophers who defended the idea of natural necessity. What was the intention of these thinkers who so long and so fervently maintained their rationalistic dogma? They were motivated by fear of social chaos, and by their desire for some absolute foundation for social institutions. The authority of church or state, they felt, must be absolute. Sovereignty must be one and indivisible. Otherwise, they thought, there can be no authority, no sovereignty, no assurance of law and order. To this practical consideration was added the desire for some absolute foundation supporting

postulate of theoretical science. But science, we have seen, postulates also the particularity or difference of things, underlying or accompanying their similarity. This is the meaning of the scientific emphasis upon particular fact as the criterion of general theory. Why, if things are radically different, should it be assumed that they will always present similarities? Why, if things are free and not necessitated, should they necessarily present any universal structure? Why should the physical structure inferred from yesterday's facts hold of tomorrow's facts? Why should things conform at all? Why should nature not be chaos, devoid of large and lasting order?

A possible reply to this question would be to say that nature may indeed be chaotic, and the apparent order of nature only a mental framework which we project into nature. This Kantian reply we cannot accept, because it destroys all scientific and moral faith. Another possible reply would be to say that since science does exist, and supports itself upon the postulate of natural conformity, the existence of science establishes the fact that nature is uniform and must be uniform. This is to claim too much. Science discovers much uniformity in nature, it is true; but it discovers no reason why there must be uniformity. In its acknowledgment of particular character as most real and ultimate, science implies that the order of nature rides upon a deeper disorder or chaos; and the physical scientist, in his recent researches, has demonstrated that this chaos or indeterminacy exists, and that it sets limits to scientific description. Why should chaos not increase, and devour whatever of order there is? Human society occasionally falls prey to chaos. Why should nature at large not do so? What keeps things similar, what makes them more similar than they were, or similar in new ways?

The philosophy of the future will make its first principle the radical individuality of things; but it must also do justice to the uniformity of things which makes theoretical science possible, and to the community of persons which makes govern-

consequence of this error was a failure to appreciate the *effective* reality of individual character. The notion of fixed species, for example, requires the notion of a superindividual force working in or upon individuals, and confining their activities within specific limits. In fact, however, the species effects nothing—all that happens in this world is the result of individual interactions. Why a species or type persists is something that calls for explanation. It is not explained by the existence of the species. It is known that the continued existence of a species means that the species is adapted to its environment. What do we mean by "adaptation"? To say that a species is adapted means that the individuals comprising the species are adapted to one another and to the other things affecting them. Each individual thing exists in interaction with other individual things. Each individual is dynamically dependent upon the other individuals to which it reacts. It is evident that the reactions of a thing may be destructive or preservative of the things which stimulate its reactions. If its reactions are predominantly destructive of these stimuli, the thing will no longer be stimulated, it will no longer react, it will cease to exist.

In this way, we are led back to the true insight which underlay the Greek error. The Greeks saw that nature comprises an economy, composed of things so adapted to one another that their reactions to one another preserve them all. *There is an economy of nature, even as there is an economy of man.* The Greek error was to suppose that this economic pattern is fixed, and that it preserves itself. In truth, the economic order is not fixed, it continually evolves; and it does not preserve itself, but it has been created, perpetuated, modified, and enlarged by the individuals dependent upon it for their existence. This is the true moral law of nature, embedded in the very conditions of individual existence; and out of this basic and original moral fact have proceeded, "in the order of time" as Anaximander said, all the orders and uniformities of the world. The individual entities composing nature are by definition different, and they

exterminatory war. The same causes produce the same effects today. Out of this chaos of human violence, we must believe, arose the first political institution, possibly the clan system. The large and congested population was organized into a number of clans. The individual identified himself only with his clan, which protected him from the mass-excitement and violence generated by the larger population. The individual could know his small clan, and he could accept its rather rigid regulation of his behavior as a condition of peace. Among the clans was preserved a minimum of necessary intercourse, carefully controlled. By the clan system an amorphous and delinquent population was crystallized into a viable pattern.

That political institutions originated somewhat in this way is suggested by the ritual and symbolism of the clans. Each clan identified itself with some plant or animal species; and the first "gods" appeared in mythical Wolves, Bulls, Oaks, and Fishes whose "life" was the enduring life of the clan. The clansmen were "children of the Bull"; and for them beef was *tabu* except when eaten ritually, with awe and trembling. What was the spell of these symbolisms, which have persisted through all the centuries of civilization down to today? Did the congested war-diseased population look back with nostalgia to the "state of nature," which disappeared with the domestication of plant and animal food? Did men long to be again just an animal species sharing the natural economy of the wilderness? And did the clan system profess to be a return to that state of nature, in its solemn pretence that humans are "really" wolves, cattle, sheep, and fish? Again and again, in later history, we see populations which have outgrown their political economic institutions rise in social convulsion, and attempt a "return to nature." How can man return to nature, what does the nostalgia for nature mean? Man returns to nature only by his creation of political-economic institutions which remove congestion, and allow populations larger than have existed before

physicochemical environment, this advance being usually spoken of as "the scientific and industrial revolution." For a century, there has been enormous human increase, leading to social congestion, mass-excitement, and exterminatory wars. Once again we seek new political institutions, partitioning humanity into viable groups and regulating the intercourse of these groups. And once again men turn, in their search for a symbolism supporting this new order, to a myth suggested by those interests which led to the congestion from which they must be saved. It was scientific interest in physicochemical nature which initiated the industrial revolution, with all of its social consequences. So there appears today the symbolism of materialistic philosophy, assuring us that if we will only believe that men are (not wolves or sheep or fish but) physicochemical mechanisms, the social future will be secure. This materialistic philosophy is usually presented as nothing but science itself; but materialism is metaphysical myth, and not science. The physicochemical processes constituting the human being are to be understood more by way of their difference from other physicochemical processes than by their likeness to these. Whatever overlooks or denies specific or individual difference is a myth. Science is just the consistent refusal to neglect specific and individual differences. From science we deduce, in place of myth, the truth that respect for individual being is the foundation of all human and natural economy.

When we survey the large course of evolution, we see that it has proceeded by great leaps or abrupt departures from type. This is what allows us to classify things into species, genera, orders, etc. Consider, for example, the chemical elements, each type of atom clearly demarcated from its ninety-odd fellows. Why is nature not qualitatively continuous, in such a way that between any two known types there will be found a third? Why is nature specific? The answer of science is that nontypical individuals have existed, but have failed to survive and reproduce themselves. This still does not explain why new and

congestion, in which things otherwise well adapted are overstimulated by things of their own kind. The individual is no longer adapted to members of its own species. There occurs in all of nature the violence and destruction which in human society is war or massacre; but there also may occur those creative responses which initiate new sorts of adaptation supporting an increase of being. These creative responses are the reactions which have established new types and species, and advanced the progress of cosmic evolution. The whole course of evolution may be understood as a creation of material nature, with continuous increase in the number or quantity of existent things, this increase requiring the continuous readaptation of things primarily to things of their own kind. Evolutionary progress is a qualitative progress, advanced by the rise of new and more deeply adapted types of being; but the qualitative progress is also a quantitative progress, the new type being "higher" just insofar as its reactions tolerate and support an increase of being. Thus the progress of human character is to be measured by the increase in human life which it makes possible; and human progress is accordingly most easily appreciated in terms of the development of the political economy, by means of which man has supported in health and security a steadily increasing population. Materialism was right in its quantitative emphasis; but it overlooked the fact that the size and security of a population is dependent upon the character of the individuals composing it. Idealism was right in its emphasis upon quality; but in rejecting quantitative measure, it deprived itself of all objective moral criteria, and inevitably became arbitrary and prejudiced. Use the quantitative measure; but discover the quality which conditions the quantity of life or other existence!

There is every reason to believe that human progress illustrates the principle which has determined the evolution of nature at large. Human progress is conditioned by the appearance and spread of new qualitative character, which sooner

of violent disturbance need not of itself effect the moderation of violence, by means of an advance to some new form of organization. This transcendence of old forms by new forms is unpredictable and mechanically inexplicable. How can it be explained, if not mechanically?

Mechanical explanation means the exhaustive analysis of any particular occurrence in terms of uniformities or similarities already known to invest entities of the sorts involved in the occurrence. But the appearance of a new type or species, establishing a new pattern of interaction among things, by definition escapes reduction to earlier uniformities. The new type is "emergent." Darwin rightly attributed to chance the individual variations which he saw to be the condition of specific change. He did not mean, he said, that these variations are uncaused, but only that their causes escape detection. Biological science through its genetic studies has advanced far beyond Darwin in its knowledge of the mechanisms of heredity; but it must still statistically attribute to "chance" the origin of what genetic combinations shall occur, to determine the character of a living population. Recourse to statistical methods involves a renunciation of strictly mechanical explanation. The latter seeks to determine causal relations among individual entities, whereas statistical analysis seeks only to determine approximate uniformities of group behavior.

It should not be supposed that the use of statistical methods prejudices the scientific conviction that everything happens by due cause. On the contrary, statistical science establishes this causal postulate more firmly. When the empirical philosopher challenges the postulate of universal necessity, he means to deny that particular events must necessarily conform to some universal design. He does not deny, rather he most emphatically insists, that particular events are causally necessitated by other particular events. His intention is to affirm particular causation, and to say that all effective causation is the work of individual entities interacting upon one another. This means,

ways. The conformity of things, evolutionary science informs us, is more than bare uniformity. The conformities or uniformities preserved by nature are ways of reciprocal adaptation among things, these reciprocities constituting a natural economy. The specific types of nature are due to the multiplication, spread, and persistence of certain individual characters which proved to be preeminently adapted. The classification of natural species points to a natural history, which, if we could know it, would inform us of the individual entities in which these species originated. There has been an historical succession of individual characters establishing new and better adapted types. These individuals have advanced natural evolution from its physical and chemical beginnings, through its mineral, organic, and social stages, to what is supremely human in man today. These potent individuals are the true creators of the world.

It is for the philosophy and science of the future to elaborate and propagate this truth. Only individuals are causally effective; and the total achievement of effective individuals is nothing less than the creation of the cosmos. It may some day be scientifically demonstrated that henceforth the hub of cosmic creation lies in the human life on this planet, in that the activities of human life proceeding on earth exert just that small but decisive influence which makes the difference between cosmic health and cosmic decay. In this case, man would literally become the creator and providence of the world. However this may be, fact and logic compel the conclusion that nature is and always has been the creation of its individual constituents. It is a democratic world that we inhabit, the divine government of nature being wholly that of the things in it.

This insight into the individual origins of natural uniformities revolutionizes man's concept of nature. It provides full and final release from the dogma of material necessity, and opens our eyes to the creative power which always has invested and

Human memory, in historical science, brings some acknowledgment to the seers, statesmen, scientists, and saints who by word and deed have established new adaptations of the human individual to his human and natural environment. Behind these heroes are the anonymous and unsung individuals who inspired them; and back of human history is the unrecorded past, human and subhuman, no less rich in individual achievement which carried energy from its immaterial beginnings, through its chemical, mineral, and organic stages, to man and his civilization.

We cannot develop this theme here. To do so would be to transform science into the religion it ought to be and some day will be. For what we shall learn is this: Creative love alone has from the beginning engineered this world; and if man abjures this religious love, the very stones will cry aloud their adoration, and take up the creative work which man lets fall. But we shall not let it fall. There lies ahead of man a heaven that shames all prophecy. That heaven, or annihilation, is his destiny.

Philosophy in this way finally returns to the deeper truth of religion such as that of the New Testament, or of art when it points to a mercy and love which is the deeper fount of all justice. Political institutions, whatever their form, will not give us security and peace if they are observed only in the letter, and not in the kindly spirit which created them and which they were created to serve. No more than logic provides scientific truth if it is not the instrument of willing attention to all particular fact, does a democratic constitution secure justice if it is not used to implement a kindly and loving goodwill toward all human individuals. Let democratic society lose its loving-kindness, let it confuse the machinery of democratic government with the tricks of power-politics, and very quickly a political majority will by harsh and autocratic action incite some offended minority to justified rebellion. The democratic constitution will secure justice if it makes effective in legisla-

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